

**HEALTH AND
HUMAN PROGRESS**

HEALTH AND HUMAN PROGRESS

AN ESSAY IN
SOCIOLOGICAL MEDICINE

By

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PREFACE BY

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Man hardly realises that he can shape
his own destiny.

BERGSON.

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PREFACE

by ÉDOUARD HERRIOT

HUMANITY takes a pride in its victories, it flatters itself that by means of instruments of wonderful precision and speed it has conquered space and time and reduced the elements to submission.

In the domain of morals, even pessimists do not deny the progress made since the time when the insane were chained in dungeons, and when, to discover the presence of fire-damp in a mine, a "penitent" (either an old man or a culprit wishing to atone for his sin !) was sent down the mine every morning with a torch. That was not more than two centuries ago.

At present, legislation assures for the worker a minimum of safety ; youthful delinquents appear before courts which aim at reformation and adaptation to a healthy environment ; education has become accessible to the masses.

To quote Professor Winslow :

If we had but the gift of second sight to transmute abstract figures in flesh and blood, so that as we walk along the street we could say "that man would be dead of typhoid fever, that woman would have succumbed to tuberculosis, that rosy infant would be in its coffin", then only should we have a faint conception of the meaning of the silent victories of public health.

They ought not, however, to disguise the magnitude of the task which will confront us as soon as we have the courage to face it. It is immense. Investigations dealing with American families classified according to the father's income, show that the infant mortality of the poorest classes trebles that of the well-to-do.

In England, in 1921, the mortality rate of illegitimate infants was double that of the legitimate. In France the legal distinction between legitimate and illegitimate children rejects the latter in

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sorrow and poverty. Abandoned mothers who do not gain admittance to the few existing maternity homes are reduced to deplorable conditions.

Unemployment at present claims millions of victims; in Roumania corn is burnt as fuel and in Brazil coffee is thrown into the sea, while entire populations in China and Central Europe are poverty-stricken and underfed.

In spite of science we are still unable to organise the production and distribution of wealth by mutual agreement among nations, to silence selfish interests and to make the general welfare our only care; this will be a matter for profound astonishment to the future historian.

By means of firmness and unfailing perseverance life can be prolonged, which is good, and health improved, which is better.

With this object in view Dr. Sand has drawn up a fine programme; to make progress serve us instead of enslave us, seems to me to sum up his reasoning and his wise deductions. "The machine," he says, "develops the intelligence and the moral force of him who uses it." It is quite true that the real meaning of life is only to be learnt in the rough and healthy discipline of work. Without this man does not realise his true dignity. To protect this, the social services of industry must be improved and rendered more effective.

After passing through the stage of "paternalism," when their chief object was the increase of output and profits, social services to-day promote co-operation between all concerned in business enterprises. To attain this object several measures are necessary; for example, to raise the age of child labour, to promote generalised vocational guidance, to use education and prevention rather than relief. The author exhorts us to suppress slums, to institute social centres and clubs, to organise leisure and create joy and beauty; he has concerned himself not only with the worker's health, but also with his feelings, and he endeavours to restore the supremacy of the human over the economic element.

In a fraternal spirit, he dwells upon the means to avoid suffering and ignorance, and to release spiritual forces. He invites to this task men of good will. May his appeal be heard!

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CHAPTER I

THE ADVENT OF SOCIOLOGICAL MEDICINE

ACCUSTOMED to observe human life, physicians could not fail to recognise the influence of social conditions upon health. This problem, however, remained outside the field of their normal activity. Thus it was for the benefit of future generations that Ramazzini, early in the eighteenth century, brilliantly inaugurated the study of occupational diseases, and devoted his attention to the condition of the working classes. Hitherto, the masses had not been deemed worthy of interest. Disease was treated individually, without investigation of its fundamental causes or measures to attack their roots.

The nineteenth century introduced civil and political equality, but while the people of the countryside were liberated from their servile state, a working class of ever-increasing numbers was dominated by the iron law of wages, doomed to dwell under insanitary conditions, and abandoned to charity in sickness and old age. Periodically, their sufferings were increased by spells of unemployment. Such misery aroused the public conscience. Social questions demanded attention. Science approached the study of human communities with the *Physique Sociale* of Adolphe Quételet (1836), and the *Sociologie* of Auguste Comte (1837).

For about fifty years a few physicians and hygienists had drawn attention to the part played in general prosperity by the

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health of the masses. If it had been then recognised, sociological medicine, which these pioneers foresaw without giving it a name, should have been able to find its direct line of expansion. We see it, on the contrary, towards the middle of the nineteenth century, insinuating rather than asserting itself. It was roused to a fragmentary and anonymous existence through the initiative of philanthropists, of social-minded employers and of the working class itself, as well as through legislative and administrative measures. Deaf to the appeal of its prophets, medicine did not approach the social domain spontaneously, but was dragged into it by the development of hygiene, of public assistance, of social insurance, of labour legislation.

Nevertheless, this evolution was logical ; medicine had been nourished by physics and chemistry, and afterwards by physiology, bacteriology and parasitology. It remained for medicine to receive the contributions of psychology and sociology.

This evolution was also necessary ; to be preventive, medicine must regulate individual and social life ; then it comes to understand that social factors command even curative methods, for the working of our organs is the mirror of living conditions. From this moment on, medicine wants to recognise the whole nature of man, as shaped by his home, his surroundings, his work, his recreation, his struggles and aspirations. Thus every part of medicine becomes social.

Such changes are slow and encounter strong antagonism. When Bayle counted the pulse and respiratory movements in his patients he was accused of attempting the ruin of medicine by the introduction of arithmetic ! We all know how a clique persistently fought against Pasteur. Sociological medicine rouses still more violent opposition, for it is not confined to the introduction of new ideas and the upsetting of traditions—it threatens private interests.

This is why sociological medicine awaits its civic rights. A few accessory lectureships, some often ephemeral periodicals, a dozen or so treatises creating little response, such are the sole organs of a science which still seeks its definition, its synthesis and its universality. Connected with public institutions or with private agencies which limit at their will its resources and field

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of action, sociological medicine maintains a local or a national form. However, if its component parts are scattered they are everywhere present.

In the struggle against infant mortality, against tuberculosis, and against those diseases which result from the conditions of human life, hygiene allies itself with assistance and social insurance.

Labour legislation and the rationalisation of industry revive occupational pathology and promote the development of industrial physiology, industrial psychology and industrial hygiene. Clinical medicine calls on the social worker to enlighten the medical by the social diagnosis and to complete medical by social treatment.

A more efficient organisation of medical equipment obtains by team work among doctors. Group medicine is gaining on individual practice. Criminology, born from forensic medicine widened to the social horizon, leads criminal law and penal administration into new paths. Thanks to the biological, psychological and social study of the child, educational methods are transformed. Colonial policy is directed towards the sanitary and social protection of the native.

Governments, formerly wasteful of human life, are led to economise and cultivate this living capital. Century-old evils which corrupt and destroy it—disease, poverty, ignorance and neglect—are no longer dealt with solely on a humanitarian basis, as the cause of sufferings from which we should spare our fellows, but also on an economic basis, as a waste and confusion unworthy of good management.

In linking up the physician with the factory, the school and the court, in making use of his knowledge to renovate the most diverse human activities, our era justifies the prediction of Descartes: "If it is possible to find some means of rendering men in general wiser and more useful than they have been hitherto, I believe that it is to medicine that we must look."

We observe that nothing remains individual. Everyone borrows from the community. Production and sale, education and assistance, become collective functions calling for a rational

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organisation. Henceforth can medicine be anything but a social service ?

Sociological medicine in its constitution has not followed the straight path of logical development. It is only pure science such as anatomy which proceeds in this way. Practical sciences, on the contrary, represent a confluence towards which streams of varied course, arising from all points of the horizon, carry different waters which flow side by side long before they mix.

It is in industry that medicine has established contact with social affairs, and *occupational medicine* is historically the first branch of sociological medicine. After the ancients, who were acquainted with the diseases of miners, runners and wrestlers, who had learnt how to protect themselves against lead poisoning (Pliny), and who, with Xenophon, already believed that "mechanical arts ruined the bodies of the workers"; after various pioneers such as Paracelsus (1527), a genius with the manners of a charlatan, and Agricola (1556), a careful observer of the life of miners, Bernardino Ramazzini (1700) laid the foundations of occupational medicine in his treatise *De Morbis Artificum Diatriba*. Resumed later on by a succession of investigators, this science has found a stimulant in social legislation, whose rapid developments enriched the medical knowledge of occupational accidents and diseases, industrial hygiene, and lastly, industrial physiology—the science of economy and efficiency of effort, to which physicists had contributed since Amontons, Daniel Bernouilli, Euler and Coulomb, chemists since Lavoisier, physiologists since Chauveau, Marey and Mosso, mathematicians and civil engineers from Vauban to Taylor.

In Europe, the United States and Japan, going beyond Taylorism which aimed at economy of muscle, research was directed towards the physiological organisation of industry. Industrial psychology, on which are based occupational guidance and selection, as well as the right choice of working conditions, was founded by Munsterberg (1913). It has produced such striking practical results that the Institute of Professor Myers in London is maintained from contributions paid by the manu-

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facturers. The health and contentment of the personnel are now recognised as factors of efficiency.

The study of labour leads one naturally to investigate the *standard of life of the labourer*. This was done already by Ramazzini, who did not concern himself solely with occupational diseases, but also studied the condition of the masses. He pointed out that in order to relieve that condition Governments must listen to the voice of medicine. Towards the end of the eighteenth century Johann Peter Franck, Professor at Pavia (1779), Fodéré of Strasbourg (1797), in his book on *Les lois éclairées par les sciences physiques*, Benjamin Thompson, a soldier in America, a scientist in England, and a cabinet minister in Bavaria under the name of the Count of Rumford (1796), Franz Anton Mai, ministerial councillor in the margraviate of Baden, and Professor at Heidelberg (1802), all urged the State to adopt a universal medical policy, which Ratchet of Pavia, in his *Traité de la Prosperité physique des nations*, named "political medicine", and Puccinotti of Urbino (1836) called "Social and political eudionomy". Since Pettenkofer (1882) it is known on the Continent as "social hygiene".¹

After Holbach, Condorcet recognised the double role of "conservative medicine" and "preservative medicine". His aim was to destroy "the two most active causes of degradation—poverty and excessive wealth".²

Jeremy Bentham, Adam Smith and Malthus, in studying the relation of the conditions of existence to population movements and national prosperity, came to similar conclusions, at

¹ In Anglo-Saxon countries the term "social hygiene" is limited to the prophylaxis of venereal diseases.

² In his book entitled *Esquisse d'un tableau historique des progrès de l'esprit humain* (1793) Condorcet concludes by predicting the general improvement in social conditions by the progress of science and technique, and by an organisation directed to increasing efficiency. He visualises compulsory education—civil, domestic and technical—and the new pedagogy; the development of hygiene and the indefinite prolongation of human life; the equality of man and woman; the voluntary limitation of births; the organisation of peace; the abolition of poverty by a system of universal insurance. Daniel Defoe, the author of *Robinson Crusoe*, in his *Essay on Projects* (1697) formulated a plan of compulsory insurance against sickness, the poor "demanding subsistence as a right instead of begging for it as a charity".

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any rate in principle. Half a century later, inquiries conducted in France, Belgium, England and the United States revealed to what considerable extent the working classes suffered from ill-health. About the same time Constantin Pecqueur wrote a book with the significant title, *Des améliorations matérielles dans leurs rapports avec la liberté* (1840). Social questions came to the fore and the term "Social medicine" arose spontaneously in France.

In 1847 Dr. Solomon Neumann of Berlin published a book on *Public Health and Property*, in which he stated that medicine is fundamentally a social science, and that as long as it does not correspond to this reality we cannot taste its fruits and must content ourselves with the rind. In 1848 Rudolph Virchow declared that physicians are the natural councillors of the poor, and that to a great extent medicine is the key to the social question.

These prophetic views were not at the time understood. Hygiene, awakened from the prolonged sleep into which it had fallen since the time of the Romans and the Arabs, at first appealed, not to the physician, but to the architect, the engineer and the chemist. Insanitary dwellings were demolished, boulevards and parks were designed, water pipes and sewers were laid down, schools and public baths were constructed, abattoirs were built and measures taken against the adulteration of food.

The discoveries of Pasteur inaugurated a new phase in hygiene by demonstrating that infectious diseases resulted from the interplay of two factors: on the one hand, micro-organisms and parasites; on the other hand, the resistance of the body. The physician was no more contented with diagnosis and treatment. In collaboration with the public authorities he carried out inoculation, isolation and disinfection. Preventive medicine became associated with hygiene.

But while prophylaxis against acute diseases might remain of a medical and administrative order, the fight against chronic diseases led into the field of social conditions. It is not sufficient to isolate a tuberculous subject, it is necessary to provide for him and his family. When medicine and hygiene require to be associated with public and private assistance and with social insurance the medical clinic grows into a welfare centre. Visiting nurses are called to undertake the hygienic education of the

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patient and his family. The State is charged with the duty to condemn slum dwellings, insufficient wages, excessive hours of labour and insanitary factories ; hygiene inspires social legislation.

In a similar way, the campaign against infant mortality showed that the medical supervision of infants is not enough ; the mother needs instruction, protection and often assistance. In this way infant welfare clinics were established, with doctors, visiting nurses and social services.

The care of the pregnant woman, of the preschool child, of the school child and the adolescent led to the same expansion of hygiene into the social field. Similar procedures were adopted in the campaigns against venereal diseases, leprosy, trachoma, malaria, hookworm and mental affections, against the abuse of alcohol and narcotics, against cancer, heart disease, rheumatism, blindness and other forms of incapacity. Soon the clinics which perform these various functions began to be grouped together in Health Centres.

Hitherto defensive and passive, hygiene becomes active and constructive by housing reforms and town-planning, by popular health instruction, physical culture and the rational utilisation of leisure. Man, not his surroundings, becomes the centre of hygiene, as he was of medicine. Social hygiene is not only general, but also individualised according to the constitution of the subject.

If hygiene relies upon statutory and voluntary assistance, the latter calls on hygiene to break the vicious circle by which poverty engenders disease, which in turn creates fresh poverty. Sociological medicine benefits by a third factor furnished by *social work*, that is scientific charity, organised and integral, supplied by trained social workers.

Social group work appeals to legislation as to private initiative, to prevention as to hygiene, to tear out the roots of poverty by attacking social evils and raising the standard of life. This is preventive and constructive social work.

Social settlements, especially, renew among neighbours the bonds which urban life has loosened, and try to satisfy the need of friendly intercourse, recreation, physical and intellectual culture, and concerted initiative. They associate themselves

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with the Health Centres as soon as it is discovered that the action of the one is complementary to that of the other. There is no physical and mental balance without a true social life, no social balance without health.

Social case work, based upon a social diagnosis and treatment as strict as are medical diagnosis and treatment, consists of those processes which develop personality through adjustments consciously effected, individual by individual, between men and their social environment (Mary E. Richmond). It is not content with palliative and temporary measures to allay crying needs, but aims, through judicious and persevering action, at curative, permanent results.

The first condition for this individual reclaiming of the poor, the neglected, the wayward, is the restoration of health, which is too often damaged. Social service therefore appeals to the physician. But still more intimate bonds have been established between social case work and medicine, thanks to the introduction, by Dr. Richard Cabot, of the hospital social service (1905) of which the Lady Almoners of the English hospitals were the first pioneers (1895). When social service collaborates with medicine the whole personality of the patient is studied and treated, not only the clinical aspect. Formerly, medicine concerned itself with the definition of *diseases*, that is to say with abstract types. More recently, it has studied the *patients*, i.e. pathological cases. At the present time it administers to *sick people* a form of treatment which is at the same time medical, psychological and social. For instance, occupational therapy, at first provided for mental and tuberculous cases, has led to occupational guidance and training for all classes of chronic sufferers. The hospital, formerly an institution for cure, becomes also a preventive and educative centre; social and medical forces join together in this action.

Sociological medicine owes a fourth contribution to *forensic medicine*. At the confines of sociology, criminal law, penal science, psychology and medicine, Lombroso, in 1875, established criminal anthropology, expanded by Ferri (1880) into criminal sociology. Aschaffenburg (1902) enriched it with criminal psychology. It is studied to-day under the name of *criminology*,

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which originated in the American school—Healy and others. Abandoning the abstract idea of crime and the arbitrary estimation of a responsibility, the very conception of which is foreign to science, criminology studies the delinquent from the organic, psychological, occupational and social aspects, with a view to achieve his reformation, or order his segregation if he is irreformable. It is its special object to prevent crime by means of mental hygiene, education, public and private assistance, social reforms and eugenics.

Lastly, social medicine has obtained valuable contributions from what were formerly called "*natural sciences*" and "*moral and political sciences*".

Many obscure points in physiology, pathology and hygiene have been enlightened by the discovery of the internal secretions and vitamins, by a deeper understanding of the mechanism of life, and by the progress of physico-chemistry, bacteriology, parasitology and epidemiology.

In 1866 Mendel, the head of a monastery in Bohemia, founded genetics, the science of heredity. To Sir Francis Galton (1883) we owe the science of eugenics—the method of improving our hereditary endowment¹—and biometry, which, developed later by Karl Pearson, utilises statistical methods and the mathematical theory of probabilities to study the quantitative aspects of biological phenomena. This method, applied to man, is known as anthropometry.

In the mental domain new points of view are furnished by experimental psychology, which led to psychotechnique; by the psychology of primitive tribes and that of the child, which transforms pedagogy; by the psychology of animals and the study of behaviour; by the psychology of the abnormal; by collective and social psychology; by the study of intuition and the unconscious; by investigation of the sexual life, by "*gestalt*" *psychology*. Binet established quantitative psychology in undertaking the measurement of the intelligence.

Statistics, perfecting their methods and extending their applications, have shown with increasing precision the extent of social evils and the factors which act on individual cases. They have

¹ In Germany this is known as racial biology or racial hygiene.

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enabled us to rate the efficiency of social and health work. Sociology leads from the administrative and juridical to the organic conception of society. Formerly static, it becomes dynamic. Economics, the science of material wealth, moves toward social economy. In the wake of anthropology and human geography, human ecology or ethnogeny studies the reciprocal action of environment and of groups in evolution, as animal and vegetable ecology do in their domain. Research, surveys and social experiments build up the materials of a natural history of social man.

The field of these studies extends with the aim of covering the whole world. International hygiene and statistics have already been constituted; we may yet see the birth of international sociology, economics and psychology.

As it advances into new domains science abandons the abstract idea of the typical man and applies itself to the study of individual differences. We have already mentioned how medicine and criminology were led in this direction. In the same way, psychology no longer describes the mind but studies individual minds; pedagogy no longer disciplines the child, but watches the harmonious development of individual children; human morphology or biotypology analyses the constitution of individual human beings and finds on its way characterology which similarly analyses their character. The partitions are abolished between the physical and the mental, the individual and the group, the normal and the abnormal. If every personality and every condition is the result of a complex of biological, psychological and social factors, then the priest, the physician, the teacher, the judge, the business man, the nurse and the social worker cannot act in compartments, but must combine their efforts. Interdependence of all the factors of life, interdependence of men and of nations, such is the lesson of our time which by attacking age-old evils aims at the rational organisation of human activities.

Like all the sciences, social medicine has in its first phases submitted to the influence of national characteristics.

In Germany, Austria and Switzerland the institution of social insurance, soon embracing two-thirds of the population, imposed

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on the medical profession a new conception of its function, and led to *Social Insurance Medicine* (Thiem and Kaufmann), *Social Pathology* (Ewald and Grotjahn) and the *Social Aspects of Hygiene* (Weyl, Schlossmann, Teleky, Gottstein, Prausnitz and others). Here, the origin of sociological medicine is for the most part of a *legislative* order.

In Italy the teaching bequeathed by Bernadino Ramazzini, the first physician who "made the workshops his clinic and his laboratory", inspired a group of distinguished men such as Mosso, Baccelli and Celli, Herlitzka and Patrizi, Pieraccini, Loriga, Ferranini and Carozzi. This trend turned their attention towards occupational physiology and pathology. They found their first centre of study complete in the *Clinica del lavoro* founded by Devoto at Milan. Enriched with criminal anthropology by Lombroso and Ferri, social anthropology by Niceforo, pedagogic anthropology by Montessori, sociological medicine in Italy bore the impression of *physiology* and *clinical medicine*.

In France and Belgium sociological medicine was advanced by Meynne, a Belgian author too much neglected, by Jules Rochard and Duclaux, who advocated the social side of hygiene, by Budin, Pinard, Grancher, Calmette, Malvoz, Léon Bernard, Edouard Rust, Armand-Delille, Georges Schreiber, Toulouse, Parisot, Jules and Paul Courmont, initiators of infant welfare centres, anti-tuberculosis dispensaries, anti-venereal clinics, mental hygiene clinics, hospital social service and centres for preventive medicine. Sociological medicine in France became especially directed towards *prophylaxis*.

In England, Sir Edwin Chadwick, who inspired the reform of the poor-law, secured, in 1848, the creation of a National Board of Health supported by a statistical department, to which Farr gave a considerable extension. From Sir John Simon to Sir Arthur Newsholme, the Health service was expanded so as to become in 1919 the Ministry of Health, of which Sir George Newman was the first chief medical officer. This evolution illustrates the part played by *public administration* in the growth of sociological medicine in England.

In the United States, philanthropists, to remedy poverty, directed their attention to hygiene and made it a civic virtue.

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In social work agencies, physicians, psychologists, hygienists, judges, teachers, nurses and social workers united forces in a common work of rehabilitation and preservation. Claiming such names as Welch, Gorgas, Biggs and Trudeau, and led towards mental hygiene by Clifford Beers, public health and preventive medicine in America included sociological medicine, the primary source of which was *philanthropy*. The edifice of sociological medicine is being erected at the junction of these convergent routes, which carry the contributions of legislation and administration, physiology and clinical medicine, prophylaxis and philanthropy. Each country shows a more or less marked predilection for one of these routes, but this choice has never been exclusive. Italy, besides its clinical and physiological contributions to sociological medicine, has struggled against malaria by legislative measures. France far from believing in prophylaxis alone, has given—especially through Landouzy—an important clinical contribution to sociological medicine. Florence Nightingale gave us the modern hospital and the trained nurse, William Rathbone, the district nurse, the United States, the public health nurse. Sir Robert Philip of Edinburgh was the pioneer of anti-tuberculosis dispensaries. The Schools for Mothers come from England, Health Centres from America. In the Soviet Republic medicine has become entirely social in teaching, in investigation and in practice. Everywhere the most varied contributions are now turned to account. Sociological medicine is not only generalised but universalised.

The origins, the evolution, the elements of its constitution enable us to define sociological medicine. It embraces but extends beyond social insurance medicine and medicine as practised in social institutions, public and private. It includes a part of collective medicine as well as of individual medicine. Its proper domain is the reciprocal influence of social factors in physical and mental health ; in short, on human personality.¹ As

¹ It results from this, as Loriga has remarked, that sociological medicine often studies the indirect causes of disease. For instance, beyond the action of the bacillus of Koch, it detects the influence of bad housing and malnutrition, thus carrying to a deeper plane the quest for the causes of sickness and for their prevention.

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there exists a tropical medicine, because tropical regions conceal special perils for the human organism, so there is a sociological medicine, on account of the dangers which may be engendered by the occupational, the economical and the moral environment. From one trade to another, from one quarter to a neighbouring district, from the married woman to the unmarried mother, from the legitimate child to the bastard, death slackens or quickens its pace. This is why the whole of medicine, both preventive and curative, must be enlightened by social science, associated with social service.

To visualise sociological medicine from a national point of view is to weaken and mutilate it. In the same way as the development, structure and functions of the different species of animal and vegetable life are only explained by comparative embryology, comparative anatomy and comparative physiology, so can sociological medicine only be properly understood by the study of the data it has collected and the measures it has inspired throughout the world.

The object of its researches and of its action, like that of medicine itself, is both individual and collective. It aims at preserving or relieving individually whoever is menaced or already stricken in physical, mental or social health. By general measures it also aims at maintaining general progress—objects which are not contradictory as sometimes thought, but complementary.

Sociological medicine is the art of prevention and cure, considered, in its scientific basis and its individual and collective applications, from the point of view of the reciprocal relations which connect the health of man with his living conditions.

Thus, by making the medical and the social factors the two terms of an equation, this definition gives to sociological medicine its full scope; it relies on the social sciences as well as on the medical sciences. The terms "sociological medicine" and "medical sociology" become synonymous.¹ Moreover, this

¹ The term "medical sociology" seems to have been used for the first time in the United States; Dr. Leartus Connor coined it in 1902. In Germany the terms "social biology", "biosociology" or "anthroposociology" have been applied to the study of the reciprocal biological reactions of the community and the social environment. This is the descriptive part of sociological medicine, as opposed to its applications.

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conforms to the facts. The social condition reacts on health, and health influences the social condition. A nation which has been given better conditions of life is more robust, and a robust nation gives a better output. Social progress is antagonistic to disease, infirmity and death ; a people so fortified produces more wealth, and consequently can raise itself to still better conditions of life.

Treatises on sociological medicine give a prominent place to its field of action, but they are less explicit as regards the mental and physical characteristics of the social classes and their inequality before disease and death. They do not study very deeply the causes of this state of affairs, and fail to draw general conclusions, to formulate principles or construct a doctrine. This is because the subject necessitates an outlook which is at the same time medical and sociological—the knowledge of the environment of the people, of industry, and of rural life, as well as of social work and applied hygiene. It is only the combination of social with medical experience that will give sociological medicine its true meaning, its unity, its solid frame.

As a descriptive science sociological medicine only takes account of demonstrated facts. As a constructive science it must remain independent of biological, psychological and sociological theories, of political, social and religious doctrines. Nevertheless, every social enterprise leads to an avalanche of repercussions. These must be carefully considered if we are to avoid sacrificing the moral to the physical, the future to the present, the essential to the accessory, for health does not constitute an end in itself, but a means of living fully. It would be a strange perversion to pursue it at the expense of spiritual values. Far from being utilitarian or materialistic, sociological medicine can only expand in the consciousness of human relationships and with a due regard for personality.

The main subdivisions of medicine are anatomy, which describes the structure of the body, physiology which analyses the functions of the organisms, psychology¹ which investigates

¹ Psychology is an autonomous science, but it is so closely connected in certain ways with medicine that it must be included in our list.

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mental processes and modes of behaviour, pathology which studies diseases, etiology which searches for the causes of morbid conditions, therapeutics which is concerned with the treatment of diseases, and hygiene whose object is the prevention of disease.

Sociological medicine should also include a social anatomy, physiology and psychology. But it seems better to include all that concerns the study of physical or mental inequalities in the different classes of society under the name of *social anthropology*,¹ as suggested by Niceforo (Chap. V). *Social pathology* studies, in the same classes, variations in the incidence, course and result of diseases; the inequalities of disease and death (Chap. VI). *Social etiology* investigates the causes of these differences in heredity and environment (Chap. VII). The *social aspects of hygiene*, in which social prophylaxis and social therapeutics are blended without any sharp demarcation, aim at combating diseases of social origin, by means of palliative, curative and preventive measures. Social insurance medicine and occupational medicine take a share in this activity. We shall consider it successively in the domain of hereditary, occupational, domestic, economical, sanitary and educational factors (Chaps. VIII to XIII).

The terms we have applied to the branches of sociological medicine are sometimes used in a different sense. Misled by superficial resemblances, certain sociologists have compared in detail the human with the social body; the description of society becoming social anatomy, the study of its functions social physiology, and social evils becoming the object of social pathology. It is necessary to guard against this ambiguity, and preserve the proper meaning of the terms.

Before dealing with sociological medicine, we shall enumerate its sources (Chap. II); we shall give an outline of social demography, or a description of the social classes (Chap. III); we shall explain what vital statistics teach us on the subject of variations, in time and space, of mortality, morbidity and fitness—the balance-sheet of sickness and death (Chap. IV).

We shall not enter the domain of special sociological medicine, which includes as many branches as medicine itself—sociological

¹ In England this term is used to signify the sociology of primitive groups.

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obstetrics and pediatrics, which study the social factors affecting the mother and child and direct the procedure in infant welfare ; sociological psychiatry, which examines the social influences affecting mind and character and bases its methods on mental hygiene ; sociological phthisiology, which is associated with the campaign against tuberculosis, as sociological dermatology, urology and gynæcology are with the prophylaxis of venereal diseases. Sociological neurology, epidemiology, cardiology and stomatology, etc., have also been described. Each branch of medicine has its sociological aspect.

CHAPTER II

THE SOURCES OF SOCIOLOGICAL MEDICINE

SOCIOLOGICAL medicine, occupational medicine, social insurance medicine, criminology, child welfare, eugenics and genetics are represented by certain lectureships, institutes and associations, and in certain journals and treatises. But the greater part of the material for sociological medicine is to be found in public and private institutions devoted to health, medicine, statistics, sociology, anthropology, psychology and pedagogy, as well as in public and private welfare agencies.

Sociological medicine is therefore to a great extent dependent for its data upon external sources, which can be grouped in five categories : statistical work ; reports issued by public and private institutions ; inquiries ; studies and surveys ; and case records.

The *census*, which was known to the Chinese, Egyptians, Greeks and Romans, has now assumed a scientific character owing to the greater precision of its methods, to a plan of organisation arranged so that no one can escape enumeration, to the increase in the number of agents employed and to their special training. Sometimes a special industrial or housing census is taken.

Usually repeated every ten years, the census is static—it is the nation's photograph. As it describes the conditions existing at a definite date, it has to be completed by a cinematography of the national life, by data of a dynamic character, such as the variations in the birth-rate and death-rate, in marriage and divorce, in criminal convictions, in production, trade, unemployment, strikes, etc.

These *official statistics, published periodically*, are then collected in the form of Year Books, the data of which are, however,

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of unequal value. Although the number of births, marriages and deaths can be accepted unreservedly,—at any rate in well-organised countries—the notification of the cause of death is subject to errors, due to family prejudice or to negligence or indifference on the part of the doctors. But these errors being relatively constant, the figures for successive years allow of fairly accurate comparison.

The data furnished by the national services are used for the compilation of international statistics which are published by the Health Organisation and other services of the League of Nations, the International Labour Office, the International Institute of Agriculture in Rome, the International Institute of Statistics at the Hague, and various special organisations.

Other official statistics issued are of a *casual* nature. For example, the physical fitness of 2,425,184 men between the ages of 18 and 42 years examined in Great Britain when military conscription was enforced, revealed an unexpected incidence of sickness and infirmity, very unequally distributed in different areas. Again, the psychological examination of 1,768,966 American recruits showed for the first time the distribution of intellectual faculties among the population.

Sociological medicine obtains important information from the *periodical or casual reports of public services and private agencies*—Ministries of Health, of Social Assistance, of Social Insurance, of Labour, of Education, of Justice, municipal health and welfare services, health leagues, philanthropic institutions, etc. These documents are sometimes descriptive, sometimes analytical. Their object is to present a picture, in relief and shadow, of "social material" and social action, the statistical records of which only give an abstract idea. Sometimes they take the form of a national compendium such as the *Social Work Year-book*, issued every other year by the Russell Sage Foundation in New York, or of an international annual such as the *Année Sociale*, published by the International Labour Office, or of an epitome such as the *Année Psychologique* or *Social Science Abstracts*.

Inquiry depends, not on a total or partial census, nor on

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direct observation of facts, but on the evidence of competent persons.

We distinguish between *itinerant inquiry*, entrusted to travelling agents, *inquiry by questionnaire*, much used in the United States, and *inquiry by depositions*, a procedure favoured by parliamentary and governmental commissions. These inquiries register the often diverging opinions of specialists and interested persons. The subject is then treated systematically in a report, which is discussed and revised by the Commission. Among these reports are some documents essential to sociological medicine. Of the more important we may mention the English Commission Report on the reform of the poor-law (1909). Although the majority were in total disagreement with the report of the minority, the latter, from the pen of Mr. Sydney Webb (now Lord Passfield), made an epoch in the history of poor-law administration.

In the United States, President Theodore Roosevelt in 1909, convoked a conference on child welfare, which drew up general principles and a plan of organisation. Twenty-one years later, President Hoover called a second conference on the same subject. The 3,000 members, divided into commissions and sub-commissions, worked with such zeal that the numerous volumes of the conference constitute an encyclopædia of child welfare. The report of the Commission on the study of social trends (1933), appointed also by President Hoover, is both an inventory and a thorough analysis of the transformations undergone by contemporary society.

We may also mention the profound researches and carefully weighed conclusions of the Commission on the cost of medical service in the United States (1927-32), at the disposal of which several foundations placed more than a million dollars, and the inquiry dealing with the effect of unemployment on youth conducted in seven countries by the International Save the Children Fund Union.

Special studies of various kinds are undertaken individually or in groups. They may present an up-to-date picture of a controversial question, or explain the results of original research

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carried out in the laboratory, in hospital, in social work, or in factories, schools or prisons. Different public and private organisations undertake to assist and co-ordinate this work ; for example, the Medical Research Council in England, a section of which is devoted to research on industrial health.

Other publications, such as those of Jane Addams and Lillian D. Wald, who established social settlements in Chicago and New York, furnish experience obtained by a daily contact with the working classes.

Monographs, usually produced by private initiative, are a blend of census, inquiry and research. They sometimes deal with a small number of families or with a special problem, a group of persons, a trade, an institution—or with a social class, a village, town, district or country.

The method of *family monographs* was instituted by the French reformer Le Play, about the middle of the nineteenth century. Adopting a fixed standard, depending for each trade and for each locality on the detailed observation of certain “prosperous” families, Le Play and his successors were able to give a precise exposition of the life of workers in the various trades in many regions of France and in most of the European countries.

Biographies and investigations of a single *family* in the course of successive generations produce data of the greatest interest. Alexander Graham Bell, the inventor of the telephone and benefactor of the deaf, published a biological analysis of 2,300 members of the Hyde family ; Lundborg studied 2,232 descendants of a Swedish family ; Pieraccini traced the biological history of the Medici family. Familial research has also been studied in Germany under the name of Familienforschung. A rich collection of human pedigrees is kept by the Eugenic Record Office at Cold Spring Harbour in the United States. In England, there is the Treasury of Human Inheritance, and similar institutions exist in other countries.

Special monographs have been published dealing with many subjects. Among these may be mentioned the researches of Slosse and Waxweiler on the diet of 1065 Belgian workmen in 1910. The study of this subject was continued by Bigwood in 1934, and showed considerable improvement in nutrition standard.

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The names of Eden and Engel are associated with family budgets. One of the most extensive investigations in this domain is that of the Bureau of Labour Statistics in Washington, which dealt with the detailed budgets of 13,000 American families during the years of 1918 and 1919.

Social agencies in the United States conduct permanent inquiries from which standard budgets can be set up for the use of welfare organisations. The publications of the International Labour Office, on wages and the cost of living, are valuable owing to their authenticity and their comparative method.

Monographs on public health date from the time of Hippocrates to whom we owe the *medical topography* which the eighteenth and nineteenth centuries have revived. In the twentieth century this has developed on new lines, such as the investigations on morbidity undertaken by Lee K. Frankel and Louis I. Dublin for an insurance company, and by Sydenstricker and Collins for the United States Public Health Service. Health demonstrations have produced data of the same order. Their prototype is the Framingham Demonstration financed by the Metropolitan Life Insurance Company, in which the population of this small industrial town was put for five years under continual medical supervision. The work of the Milbank Foundation, dealing with an agricultural district, a town of 200,000 inhabitants, and a section of New York, is an example of the expansion of this method, which is based on inquiry, action and propaganda. In France, excellent monographs on rural sanitation have been written by Hazemann and Taylor.

We must also mention the monographs of the Federal Children's Bureau at Washington on the causes of infant mortality, on child morbidity, on the application of child welfare laws, and on the measurement of two million children during the children's year in 1918. By their harmonious combination of medical and social data, the publications of this Bureau are an excellent illustration of the true conception of sociological medicine. This conception also inspired the international inquiry on infant mortality conducted by the Health Organisation of the League of Nations, as well as the work of Debré, Joannon and Crémieu-Alcan on the same subject.

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Other special monographs have dealt with old age, unemployment, abandoned or widowed mothers, emigrants, vagabonds and delinquents. Social and economic research has been conducted on the spot by public services, research organisations, scientific, philanthropic and professional groups, and by international organisations such as the International Labour Office.

We see the first attempts in *general monography* in the *Mémoires des Intendants* of the French provinces under the old régime, in the *Tableau de Paris* by Mercier (1781-8), and in the works of his contemporary Mercier de la Rivière.

In 1840, a physician, Villermé, presented to the Academy of Moral and Political Sciences in France the *Tableau de l'état physique et moral des ouvriers employés dans les manufactures de coton, de laine et de soie*. The Belgian philanthropist Edouard Ducpétiaux published in 1843 a study of the *Condition physique et morale des jeunes ouvriers*, and some years later a *Mémoire sur le Paupérisme dans les Flandres*. The Belgian Minister of the Interior undertook an inquiry into the condition of the working classes and child labour (1846-8). In 1845 Frederic Engels described the condition of the working classes in England. After the riots of June 1848, the French executive requested the Academy of Moral and Political Sciences to co-operate in the "restoration of moral order". Several members of this learned society visited the industrial centres, and their reports were widely distributed by the Academy, especially the work of C. Dupin, *Bien-être et concorde des classes du peuple français*, as well as the study of Jerome Blanqui (brother of the socialist Adolphe Blanqui) on the *Classes ouvrières en France pendant l'année 1848*. In 1857 P. A. Dufau wrote his *Essai sur la science de la misère sociale*. In England the subject was investigated by Sir Edwin Chadwick (1842) and in the United States by Lemuel Shattuck (1850). Fifty years later the American Government commissioned Carrol D. Wright to study the crowded quarters of the large towns. Jacob Riis, at first hand, described the state of the poor in New York (1890), and Mrs. Pember Reeves did the same for London. Social settlements, especially Hull House, pursued similar investigations in their neighbourhood. Greater precision is attained by limiting the inquiry to one town, as Maxime du Camp did in

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Paris, ses organes, ses fonctions et sa vie (1869-75). In Germany, Italy and elsewhere, these studies were multiplied, justifying the views of the elder Bertillon, who announced the formation of a science of the social classes—an autonomous branch of the natural sciences—the object of which was the description of social types after the manner of a naturalist.

The first monographs which combined a private census with a house-to-house inquiry were undertaken by English philanthropists. Seebohm Rowntree, in 1899, described the physical, economical, occupational and social conditions of the families living in the town of York. He also made various other investigations and from these drew up a critical study, establishing for the first time the *social statistics* of a whole population.

Sir Charles Booth undertook (1889-1903) a similar inquiry for the town of London, a formidable enterprise. A committee directed by Sir Hubert Llewellyn Smith, has recently performed the same task on an even wider scale. According to this investigation, one-seventh of the population of London lived in poverty; thirty years previously it had been one-third.

Other investigators utilised soundings, for example, Professor A. L. Bowley and his pupils visited one house out of twenty in four English towns (1913). Twelve years later they repeated their inquiry; the number of families living in poverty had diminished by half.

In the United States, the Russell Sage Foundation supplied the necessary resources for the *Surveys* of Pittsburg (Pennsylvania, 1907-8), Syracuse (New York), Topeka (Kansas), Springfield (Illinois) and Cleveland (Ohio). One department of the Foundation is devoted to these investigations. They owe their name, their plan and their methods to Paul U. Kellogg, who was the guiding spirit of the Pittsburg Survey. These investigations were directed by experts who were strangers to the town, in collaboration with local elements, representing all occupations and all sections of the population. A survey accomplishes a synthesis and an analysis of social life; it rates the amount of real service rendered by public and private agencies; it discovers the extent, causes and remedies of the evils afflicting the masses, and, lastly, it enlightens public opinion on these problems.

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The "natural history of the population" which is reflected in a work of this kind has considerable documentary value. The practical advantages are not confined to the town which has been the object of investigation but extend to the country in general, which obtains valuable information in the form of a "social balance-sheet," the circulation of which is assured by modern methods of popular instruction. In this way, the production of a monograph may arouse the social conscience and combine in a common object various sections and groups. Investigation leads to action.

A Survey may include a district, a province, or a country, as that organised in Belgium before the war by Seebohm Rowntree assisted by a hundred collaborators; or it may be limited to a quarter such as the Jewish quarter or the negro quarter¹; or it may be applied to a particular class of the population—the Indians of the United States for example; or it may be limited to the study of a certain number of families (90 in Miss Margaret F. Byington's celebrated work *Homestead*); or it is applied to a special subject, such as technical instruction or school hygiene, of which we have already given examples.²

In the United States "scores" based on a standard appraisal are sometimes given to a hospital, a school, a health agency, a child welfare centre. This form of investigation is at the same time an inspection and an appeal to the sanction of public opinion.

On the other hand, for the improvement of towns and supervision of their growth (to which King Gustavus-Adolphus of Sweden devoted himself as early as 1630), *town-planning* schemes have been drawn up, based on careful inquiry into the distribution, movements and needs of the population, into questions of transport, industry, trade and social life. We may mention the plan

¹ In *l'Histoire d'un faubourg* Mlle Chaptal has described the quarter of Plaisance, Paris. An Italian philanthropist, Orano, wrote a monograph on a quarter in Rome, the Testaccio. Monographs have been published in Canada, England, Scotland, Ireland, Czechoslovakia, Turkey and even in China.

² The Russell Sage Foundation has published a bibliography which, in 1930, included 82 general urban surveys, 72 general rural surveys and 2,621 special surveys (Eaton and Harrison).

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established by Burnham, in 1909, for the town of Chicago, and the regional plan for New York (1930) undertaken under the direction of Thomas Adams, thanks to a grant of 750,000 dollars made by the Russell Sage Foundation. Local, regional or even national planning supplies important material to sociological medicine. With the same object in view Patrick Geddes applied the methods of town planning to social investigations carried out as far as India.

Information equally valuable can be found in the publications of Municipal Research Bureaux, which exist in eighty towns in the United States and Canada, or in those of the Institute of political, social and municipal studies in Stockholm, the Institut d'urbanisme in Paris, etc. Monographs and studies in town planning are related to human geography and human ecology.

Case work represents the last, but not the least important of the sources supplying sociological medicine. This "social clinic" is the daily work of social workers, district nurses and doctors, attached to one or other of the public services or private agencies, to industrial and commercial enterprises, to labour exchanges, to the law courts, to hospitals, dispensaries and schools. The technique of case work has been worked out in detail by Mary E. Richmond in the United States and by Alice Salomon in Germany.

Surveys, family monographs, case records, constitute the elements of "Field work", or social prospecting—investigation of individuals or of families, researches bearing on groups considered typical, or on the community as a whole.

It is true that errors of observation, selection or interpretation may arise. No scientific activity is exempt from this danger. But the technique of these procedures has been rendered very precise. The use of standard forms makes for objectivity, unifies notation and allows isolation of each of the factors in question. Qualitative expressions are as far as possible replaced by quantitative terms.

Social investigation and action have often to include *statistical methods*. These, with the theories upon which they are based,

have developed considerably during the last hundred years. One cannot enter this sphere without the aid of the higher mathematics. This is to say that no statistics are valid unless they have been drawn up or verified by an expert.

The causes of error in the compiling of statistics are numerous ; the number of observations may be too small, the cases collected may be heterogeneous, they may not represent all varieties of the phenomena to be studied, the assessment may be arbitrary, or the terms of comparison may be badly selected.

The value of a figure depends on the care with which it has been established. Whatever its exactness it engenders false ideas when it is mentioned without an explanation. For instance, the average income of a certain country has increased per head of population ; but, in what measure has this increase affected small incomes, average incomes or large incomes ; incomes from investments, profits, salaries, wages ; industry, trade or agriculture ? Has the cost of living increased ? This is what we ought to know. Moreover, the average is not sufficient ; it is necessary either to represent the whole series by a graph, or to divide the observations into four, or better into ten groups (quartiles and deciles).

The most irreproachable statistics need interpretation, just as the best established fact requires explanation. It is in this interpretation that the difficulties are greatest, because the figures do not supply the key to it. Let us take an extreme example. In classifying by age the American soldiers in the volunteer army before the war, B. A. Gould found that their average height gradually increased up to 35 years. Does this prove that American soldiers grow indefinitely ? Actually, in a given population, the largest individuals are in general the most robust ; volunteers of inferior stature are thus eliminated progressively in proportion to their length of service, in proportion consequently as the soldier enters into a group of more advanced age. Another example ; if we investigate among the whole population how many children were born from mothers now aged from 20 to 29 years, from 30 to 39 years, etc., we find that the average number of children per mother increases not only to the end of the period of fertility, but to extreme old age. Evidently none of these women had

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children after 60 years of age ; but the period of fertility of those now more advanced in age relates to a time when families were generally more numerous than they are to-day. In both these examples the interpretation is evident. It is often less easy.

The further mathematical manipulation is pushed, the greater is the reserve required in accepting the results of statistics. This is especially the case in regard to the ingenious method invented by Karl Pearson of estimating the correlation connecting two phenomena. In this method a series of operations, mysterious to the uninitiated, ends in a simple number which signifies absolute correlation if it approaches unity, partial correlation if it exceeds 0.5, and low correlation if it is between 0.5 and 0.3. The correlation may be positive or negative.

But when these figures are used without careful analysis of the study from which they were derived, there is no evidence that the data serving for the basis of calculation are numerous, comparable, judiciously chosen and classified.

Here again, the door is open to all kinds of interpretations. Pearson finds a positive correlation between tuberculosis in the parents and tuberculosis in the children. This correlation can be equally explained by heredity, by contagion, and by similar conditions of existence. Going further, Pearson has made comparisons between the different correlation indices, and his results are contradicted by direct observation, a clear proof that this method may lead to error. As Niceforo has remarked, it is erroneous to represent by a single figure a phenomenon which is both complex and difficult to measure ; it is still more dangerous to compare the indices so calculated.

Great caution is always necessary in the study of social phenomena, the factors of which are multiple, varied and interdependent.

Statistics is more precise than evaluation and personal impression, but it must be controlled by direct observation, and the quantitative analysis of the data does not dispense with their qualitative analysis.

Like every mechanical or intellectual instrument, statistics may be abused. In the hands of conscientious experts statistics furnish reliable data, within its own stated limits.

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It is always, however, an approximation. It may study profoundly certain cases, but although the figures obtained are definite, their value is diminished by the restricted number of observations ; or, embracing a vast collection of units, observations are less complete and less typical. However, the representative method, i.e. the study of one case in ten, in a hundred or in a thousand, is perfectly exact, provided that the choice of cases is entirely automatic.

In general, statistics applies to arbitrarily defined groups, even in regard to the most definite phenomena. For example, if we enumerate the total number of births in a country, must we exclude stillborn infants and those living for a few hours only, also the children of visitors from other countries ? The margin of arbitrariness becomes considerable when we divide individuals into economic or social classes, or when we try to estimate the care given to infants or the order and cleanliness of a household.

Often, the phenomena under investigation cannot be measured, but only a phenomenon connected with it. For example, we do not know the number of the tuberculous ; we evaluate by basing our figure on the number of deaths due to tuberculosis. This is rather a vague estimation. Again, when we attempt to assess the population according to the family resources, as the income tax only takes effect above a certain sum, all incomes below this limit remain unknown. They do not affect the inland revenue, but the statistician must take them into account. Lastly, many statistics do not contain the elements which allow of the necessary corrections.

We should therefore not multiply statistics only, but also improve them. Improvements may be carried out in three directions. In the first place it is desirable that the various administrative services of a country and the authorities of all States should agree to adopt the same terms—and the same basis. Secondly, the statistics should be made more complete and more analytical ; it is not sufficient to establish the number of people who die from a certain disease, it is also necessary to know their age, occupation and resources, and also whether they were married and had children. Lastly, the method of indirect comparative statistics should be replaced as far as possible by that of

direct comparative statistics. Indirect comparison consists in estimating, for example, the mortality due to smallpox, on the one hand, in a country where vaccination is obligatory, and on the other hand in one where it is optional, or in comparing in the same country the curve of this mortality with the curve of vaccinations. The causes of error are obvious; it is not only the number of vaccinated which varies in different countries and different years, but also the facilities for isolation, disinfection and treatment and also individual health habits. The conclusions to be drawn from this indirect comparison are debatable; thus, in England we find opponents of vaccination who base their arguments on the official statistics. Moreover, the decreased mortality from smallpox may be explained by progressive attenuation of the infectious agent. If, on the contrary, in the same town, and in the same social group, and for the same year, we compare the mortality among the vaccinated and the unvaccinated all these objections fall to the ground. Direct comparative statistics states facts, indirect comparative statistics only presumptions.

Direct comparison often necessitates a thorough inquiry, which requires a large and well-trained staff; the expense may be considerable. It is, however, the only method which can solve outstanding problems and avoid the paradox which allows diametrically opposed opinions to be founded on the same figures.

Without exact statistics, correctly interpreted, public authorities work in the dark. The extent of evils to be remedied, the gaps in the existing organisation, the efficiency of the services and the scope of proposed reforms, are apt to escape attention for lack of statistics. To be completely effective, social action should adopt scientific methods of observation.

CHAPTER III

THE SOCIAL CLASSES

GENERAL sociology studies the origin, structure, function and evolution of communities; it seeks to grasp the essentials of social relationships, forces and institutions.

Descriptive sociology, on the other hand, accumulating material for general sociology, concerns itself with particular facts and concrete situations. For a long time, the lack of precise records has limited it to indications, sometimes to mere impressions

The expansion of statistical work, the organisation of vast social investigations, and the scientific observation of individual cases have built the foundations of a true social demography.

This sociography will enable us to measure social phenomena and social reactions, and consequently to make the requisite interventions and increase their efficiency. It interests us here chiefly when it reveals social conditions whose reciprocal relations with health form the object of our study. These conditions depend upon a great number of factors.

The first factor to consider is the *density of population*. When sparse it leaves the local units isolated; without roads, railways, schools, hospitals, sanitation, social institutions, and sometimes without security. Trade, industry and agriculture vegetate and routine and stagnation prevail, for it is only the multiplicity of contacts which socialises the individual and gives life to communities. On the other hand, if too dense a population becomes accumulated in the crowded dwellings of towns, existence assumes an unstable, hurried and artificial character, family and social relationships relax, the individual, lost in the mass, is no longer sustained or restrained, to his detriment and that of society.

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The second factor is the *distribution of the population between town and country*. History records alternating periods of ruralisation and urbanisation. At the present time we are living in a phase of universal urbanisation, of which there are certain indications of an approaching end. New countries with a moderate degree of population and especially favourable for agriculture have not escaped this concentration.

In Russia, in the Balkans, in Asia, about 15 per cent. only live in the towns. This proportion rises to about 50 per cent. in France, the United States, Canada and New Zealand, to 75 per cent. in Scotland, and to 80 per cent. in England. Among these human aggregations, some acquire an expansion and consequently a material and spiritual power, which reproduce in a considerably higher degree what has been termed the megalopolitan age of the older civilisations. These tentacular towns not only absorb the population of the small towns and rural areas, but they impose their ideas, pleasures and manners on the whole country, owing to the facility and rapidity of the means of transport, to the daily press, the wireless, the movie.

Considered from another angle, the population may be divided into two classes. The first is called *active* or *productive*. Its share of the total population is determined by two factors: the proportion of adolescents and adults to children and old people, and the number of women in independent employment,¹ compared with women managing the household or helping their husbands or fathers on the farm or in the shop. Consequently, the proportion of the active population increases with the diminution of the birth-rate and death-rate, as well as with the development of industry and the depletion of the country-side in favour of the towns. The interaction of these various factors explains why the active class represents 26 per cent. of the total population in Palestine (1931), 30 per cent. in Chile (1930), 33 per cent. in Egypt (1927), 39 per cent. in the United States (1930), 41 per cent. in Italy (1931), 43 per cent. in England and Wales (1921), as well as in India (1931), 45 per cent. in Japan (1930),

¹ In Germany, in 1925, every other woman was employed, and a third of these were married. In the United States 25 per cent. of women from the age of 15, before the crisis, were in a paid occupation.

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49 per cent. in Germany (1933), 51 per cent. in France (1926) and in Soviet Russia (1926).

The second or *non-active* class consists of women with no occupation, the majority of whom play an important social part in the rearing of children, in household duties, and in assisting their husbands in the exercise of their occupations; of children and juveniles, who often take part in these occupational or domestic duties; of the unemployed; of people of independent means; of old people, and lastly of the physically and mentally deficient, beggars, tramps and prisoners.

We will now consider the importance of these last four classes. At the most favourable times the *unemployed* form 5 to 10 per cent. of the wage-earners. In Belgium, according to Ernest Mahaim, there have never been less than 75 days of unemployment each week per 1,000 insured workmen. It is only in Soviet Russia and Palestine that there is no unemployment. In other countries the proportion of unemployed sometimes exceeds a third of the working-class population; in some districts it may reach four-fifths.¹

The number of non-active adult males of *independent means* (including pensioners) varies in different countries. The French census of 1906 estimated their proportion at nearly 1·5 per cent. of the total population. According to the Danish census of 1920, they and their families formed 5·3 per cent. of the total population. This proportion has diminished everywhere owing to the economic changes after the war; an idle life no longer commands respect.

As to the number of the *aged*, this has increased progressively at the same time as the average longevity. In France, in 1851, 10 per cent. of the population were over 60; in 1926, the figure had risen to 14 per cent. The proportion varies between 12 and 10 per cent. in the Scandinavian and Baltic countries, in the United Kingdom, Germany, Czechoslovakia, Austria, Belgium,

¹ In the United States, in the spring of 1933, the total of unemployment affected 50 per cent. of workmen, 40 per cent. of clerical employees, 15 per cent. of professional men. In Germany, in 1932, unemployment affected 30 per cent. of the insured population. In Great Britain 17·6 per cent. of the active population were totally unemployed, 45 per cent. partially (Lewis Corey).

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Switzerland and Italy ; between 9 and 7 per cent. in other European countries, the British Dominions, the United States and Japan ; between 6 and 4 per cent. everywhere else, with 4.1 per cent. in India and 4.0 per cent. in Brazil.

As regards the proportion of the nation which constitutes a burden on society, the figures are less precise. On the one hand, private charities do not always publish their statistics, on the other hand, public assistance and private charity have common beneficiaries. Lastly, the number of *those under public assistance* is diminished by the institution of canteens, family allowances, old age pensions, maternity pensions and social insurance. In Switzerland, for the year 1923, Wild estimated the proportion of those relieved by public assistance or private charity at 5.89 per cent. In France, if we exclude free medical care for those unable to afford the cost of treatment, and assistance for lying-in women, for the aged, infirm and incurable, who are now to a great extent dependent on insurance, 2.5 per cent. of the population (without reckoning members of their families) had recourse to public assistance in 1929. In Denmark, in 1930-1, those relieved by public assistance, and the members of their families, constituted 3.2 per cent. of the population, but only 1.7 of the population received permanent relief. In England, 3 per cent. of the population were relieved by public assistance in 1930, and 4 per cent. in 1932 ; the latter figure includes unemployed persons not receiving insurance allowances, as well as those receiving temporary and partial relief. In Germany, the proportion was 3.5 per cent. in 1930, and 6 per cent. in 1932, including the unemployed who had exhausted their allowances from the Insurance funds. In the United States, before the economic depression, 2.5 per cent. of the population lived by assistance, 7.5 per cent. received occasional help (King). In April 1934 the proportion of persons receiving permanent assistance, including their dependents, was 18 per cent.

When social insurance did not exist, crises multiplied the number of recipients of relief to a degree of which the United States, destitute of generalised provident institutions against unemployment, sickness and old age, offers an example. In 1846, in Belgian Flanders, half the total number of the inhabitants

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were objects of charity. But, during normal periods, in Eastern Europe and in the United States, those receiving relief form at the most 3 per cent. of the population. This proportion has diminished considerably, not without fluctuations, from former times up to the days preceding the present economic depression.¹

The distribution of the active population among the *different occupational groups* has changed gradually; agriculture recedes everywhere before industry, trade, transport and the professions. This industrialisation, allied to urbanisation and progressing with it, is only in its infancy in some countries, elsewhere it dates from a century and a half. In Bulgaria, 81 per cent. of the active population were employed in agriculture in 1920; in England 7.5 per cent. in 1921.

It is also necessary to distinguish the *independent* from the *wage-earning population*. The former include all those who work on their own account, in the professions, in agriculture, trade, industry and finance. To these must be added those holding important posts in public service or in private enterprise, who are in a different category to that of the wage-earners: clerical employees, workmen and domestic servants.

The distribution of these two groups of the active population is far from uniform. In France the wage-earners formed 58 per cent. of the active population (1931); in Denmark 57 per cent. (1925); in Germany 67 per cent. (1933)²; in the United States, 73 per cent. (1920); in Belgium, 74 per cent. (1920); in Great Britain, 90 per cent. (1924). The proportion varies with industrialisation and urbanisation of the country. The independent class is more numerous in Denmark and in France because a considerable percentage of the population are agriculturists and artisans.

The classification of the population according to its state of occupational dependence or independence is by no means parallel

¹ Barrère, in 1794, estimated the number of paupers at 5 per cent., Fourcroy, in 1808, at 10 per cent. In 1838, in Paris, 9 per cent. of the population were relieved by public assistance (in certain districts one person out of six).

² In Germany, one-ninth of the active population is formed of master craftsmen working with companions and apprentices. These titles are conferred after a period of definite duration and regulated tests.

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to its division into *economic strata*. Although the independent class includes families who live in wealth and comfort, it extends to the small shopkeepers and artisans, and also to small farmers. Their incomes are often inferior to those of the overseers of factories and shops, foremen or skilled workmen, and to those of the servants in large houses and the personnel of high-class hotels.

The distribution of capital is very unequal.

In Denmark, a country of widely distributed wealth, 5 persons out of 6 of the active population possess less than 6,000 crowns (£267, \$1,300 at the present time).

In Germany, about 1930, the family capital for 97·5 per cent. of the population was less than 10,000 marks (£822, \$4,000); 2·3 per cent. possessed between 10,000 and 100,000 marks; 0·2 per cent. possessed more than 100,000 marks.

Consequently the total fortune of 62,500,000 persons was 16,000 million marks (20 per cent. of the national capital; that of 1,500,000 persons, 35,000 million marks (40 per cent.); that of 80,000 persons, 35,000 million marks (40 per cent.); thus,

for 78,000 persons :	25,000 million marks	(29 per cent)
" 2,000 "	6,000 "	" (7 per cent.)
" 150 "	4,000 "	" (4 per cent.)

If income is added to capital, 93·60 per cent. of the population (60 million persons) had 40 per cent. of the wealth; 6·25 per cent. of the population (4 million persons) had 34 per cent.; 0·15 per cent. (100,000 persons) had 26 per cent. (Fried).

In the United States 1 per cent. of the population receiving 15 per cent. of the national income possessed 47 per cent. of the national capital in 1910, and 59 per cent. in 1926. In 1932, 13 per cent. of the population possessed 90 per cent. of the capital. Of 100 persons, 24 only left money or property after their death (Federal Trade Commission Report).

In France, however, 70 per cent. of men and women dying after the age of 30 years in 1925 left an estate; but the value of this in two-thirds of the cases was less than 10,000 francs (£137, \$666).

Similar differences apply to the distribution of income.

In Belgium (1928), 96 per cent. of the tax-payers possessed

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incomes below 25,000 Belgian francs (£247, \$1,200), 3 per cent. incomes between 25,000 and 50,000, and 1 per cent. incomes above 50,000 Belgian francs.

In Denmark (1931-2), 92 per cent. of the tax-payers possessed incomes of 800 to 5,000 crowns (£36 to £222, \$173 to \$1,083), 6 per cent. incomes of 5,000 to 10,000 crowns, 2 per cent. incomes over 10,000 crowns.

In New Zealand, in 1935, among males over 16 years of age, 36 per cent. had an income of £155 or less; 49 per cent. of £156 to £311; 15 per cent. over £312.

The following table, after Corey, shows the income, capital and spending capacity of different social classes in the United States in 1928:

Social Class.	Percentage of Active Population	Percentage of Total Amount spent on Goods Consumption	Percentage of National Revenue.	Percentage of National Capital
Upper class . . .	0.8	14.1	21.8	46.1
Middle class . . .	6.1	15.8	16.9	21.6
Lower middle class .	9.0	13.0	13.2	12.2
Upper and middle class	15.9	42.9	51.9	79.9
Farmers	13.6	9.8	7.1	15.4
Clerical employees .	10.0	7.6	6.7	} 4.7
Workmen	58.5	39.7	34.3	

In 1929, according to Leven, Moulton and Warburton:

21	per cent.	of the families	had an income of less than \$1,000
21	"	"	"
21	"	"	"
21	"	"	"
21	"	"	"
8	"	"	"
			over \$5,000

If \$2,000 may be regarded as sufficient, at 1929 prices, to supply the basic necessities for a family, 16 million families (out of 27.5 million), or about 60 per cent. of the total, were below this income level.

The 11,653,000 families with incomes of less than \$1,500

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received a total of about 10 billion dollars (out of a total of 93 billion). At the other extreme, the 36,000 families having incomes over \$75,000 possessed an aggregate income of 9.8 billion dollars. Thus it appears that 0.1 per cent. of the families at the top of the scale received practically as much as 42 per cent. of the families at the bottom of the scale.

Let us consider two groups, on the one hand the wealthy and well-to-do, including all families with incomes over \$10,000 and unattached individuals with incomes over \$5,000—on the other hand, the subsistence and poverty group, including families with incomes under \$1,500 and unattached individuals with incomes under \$750 :

Group.	Percent- age of the Popula- tion	Percentage of the Total spent by all Families on			
		Food	Shelter and Home Main- tenance	Clothing	Other Expenses.
Wealthy and well-to-do	2.4	6	19	16	33
Subsistence and poverty group	41.0	27	17	17	11

The upper 10 per cent. of the families, including those with incomes above \$4,600, made about 86 per cent. of the total savings. The second group, also 10 per cent. of the families, with incomes from \$3,100 to \$4,600, made 12 per cent. of the savings. The remainder, saved by 80 per cent. of the population, amounted to only 2 per cent.

In support of these conclusions may be mentioned inquiries carried out among workers in general, or among the cotton-workers of the Southern States, or among the Chicago labourers. As regards the latter group, in a third of the cases pecuniary assistance from philanthropic institutions was necessary to supply the deficit in the family budget (Houghteling). Of the families employed in the cotton industry, 70 per cent. lived in poverty (Lucey). All this concerns the richest country in the world during the period of prosperity.

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According to an official inquiry, in 1928-9, the requirements of half the Belgian working-class families were incompletely satisfied as regards the quantity, quality and variety of their food, and as regards housing conditions, health, and intellectual and moral needs.

Descending to the poorer countries, we see, at Porto Rico, one-fifth of the population economically independent, one-fifth in employment for the whole year, but earning less than the minimum necessary for health, one-fifth in intermittent employment at famine wages, and two-fifths living "God knows how" (Sherman).

The extreme limit in this respect is found in Asia and Africa. In the southern provinces of China, 50 to 60 per cent. of the population earn less than the minimum necessary to feed the family, not to speak of other necessary expenses. The Chinese peasant in some regions hibernates with his dependents, shut up in his hut. Russian and Silesian peasants not long ago lived in the same way, but less continuously. Some gypsies still do so.

In Indian cities one man out of two does not earn a living wage; about 20 per cent. of the rural population is undernourished during the whole year, and 30 per cent. during six months each year (Popley). The negroes of many regions of Africa and the Indians of the high plateau of South America also live in a state of constant under-nourishment.

These contrasts are chiefly due to the differences in wealth of the different countries, of which an approximate evaluation for the year 1929 has been drawn up by Professor Baudhuin.¹

Like wealth, *education* is very unequally distributed. The minimum represented by the ability to read and write is attained by more than 99 per cent. of the population of Sweden, by 5 per cent. of that of the Dutch East Indies. In certain European countries the proportion of illiterates is still 60 to 70 per cent., which is the average for the whole world (Abel and Bond). But in the most illiterate countries—India, China and Malaysia—considerable efforts at improvement have been made for some

¹ See the table on page 39. Since then the national revenue has diminished by 20 per cent. in England, 40 per cent. in Germany and 50 per cent. in the United States.

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years. The Soviet Republic has managed to "liquidate" analphabetism almost completely in a few years.

Complete secondary education is achieved by about 2 per cent. of the population in France; 3 to 4 per cent. in England; 5 per cent. in the United States. This proportion has increased rapidly; 50 per cent. of children in Sweden and in the United States attend secondary schools, and 80 per cent. in New Zealand.

In the United States, diplomas for higher education are given to 1 to 2 per cent. of the population (in Belgium 0.4 per cent.), and 15 per cent. of young men proceed to the universities; among them one-quarter are the sons of workmen or employees.

	Population.		National Capital			National Income		
	Absolute (Millions of inhabitants)	Percentages.	Absolute (Millions of Dollars-gold)	Percentages	Per Inhabitant (Dollars-gold)	Absolute (Millions of Dollars-gold)	Percentages.	Per Inhabitant (Dollars-gold).
Very rich countries . United States, Eng- land, Cuba, Can- ada, Australia .	180	9	550,000	45	3,050	120,000	46	666
Rich countries : France, Germany, Belgium, Holland, Switzerland, etc..	220	11	290,000	24	1,300	55,000	21	250
Moderately rich coun- tries . Italy, Poland, Japan, Soviet Russia, etc	550	28	275,000	23	500	55,000	21	100
Poor countries . India, China, etc. .	1,000	52	100,000	8	100	30,000	12	30
Total (or average per inhabitant) .	1,950	100	1,215,000	100	625	260,000	100	134
United States, 1929 .	122	6.1	440,000	36	3,680	93,000	36	780
England, 1928 . . .	40	2.0	114,000	9	2,500	20,000	8	372
Germany, 1929 . . .	64	3.2	74,000†	6	1,160	17,000	6.5	264
France, 1929-30 . .	41	2.1	61,000‡	5	1,480	9,000	3.5	225
Belgium, 1930 . . .	8	0.4	12,000	1	1,550	2,000	0.8	240
Switzerland, 1928 .	4	0.2	12,000	1	2,640	1,500	0.6	268

† 1928. ‡ 1930.

Profession, wealth and education form the basis of the social

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scale. In every country the distinction of *social classes* is evident, although they are no more separated by legal barriers, nor distinguished by privileges, and maintain a certain uniformity in manners and dress. In spite of persistent attempts to effect a "rapprochement", the social classes live, materially and intellectually, in separate spheres.

As Tocqueville has remarked, the classes which constitute society resemble different nations. They are so conscious of this fact that they instinctively avoid, ignore or fear each other to the extent of a more or less organised struggle. In the United States qualified and unqualified workmen used to form distinct and to some extent antagonistic groups.

Class is a sociological fact. The "social distance" is measured by the intensity and quality of understanding and attraction which exist between persons belonging to different circles (Bogardus). But in the Soviet Republic, where class distinctions are considerably reduced, the intellectuals, brought up on the old regime, find themselves enriched by their new social experience.

From the economic point of view, Ernest Mahaim distinguishes the rich, the middle class and the poor. Ostentation, opulence and moderate wealth are the characteristic scales of the first, according as its members possess an income which provides for unlimited caprice, or satisfies the widest wants, or allows an ample life. In the second class Mahaim distinguishes the upper middle class whose income permits them to live in ease, an average middle class who can live in comfort, and a lower middle class who are subject to necessary restrictions. At the lower end of the social scale are the poor, among whom there are several distinct conditions; poverty, strictly defined, in which only the elementary needs of existence are satisfied; indigence, where necessities are deficient in part; privation, where they are temporarily wanting; misery, where this state is permanent.

Mahaim's classification agrees with economic and psychological facts. Our point of view requires a simpler grouping on more definite lines. The characteristics of the social class are: the degree of personal independence of its members, the extent of their material and intellectual opportunities, and the amount of security in their existence. This independence, these oppor-

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tunities and this security may result from available resources, from education or from occupation, more often from the combination of two or three of these factors. Wealth gives independence, opportunity and security, the exercise of professions which require higher education, in a general way, has the same advantages, if we admit that intellectual enjoyment can compensate for the too frequent exiguity of material resources. From the view-point of influence and social position, in spite of their distinctions, the wealthy—proprietors, manufacturers, traders, bankers—and the intellectuals—professors, lawyers, physicians, engineers, high officials and artists—belong to the same sociological class, although not always to the same social circle.

The middle class possesses to a lesser degree the means of security held by the independent class. It includes farmers, shopkeepers, artisans and clerks. They receive land, credit, merchandise and employment from the independent class, but their position is closely connected with that of the working classes, their principal clients. This double dependence, and a keen desire to rise in the social scale, renders the middle class provident and economical, sometimes to excess.

The working class, in general, has still less independence, opportunity and security. It is true that skilled workmen can command relatively high wages, but they are dogged by sickness, unemployment and accidents; when nearing 50 years of age, or sometimes earlier, their earnings decline rapidly and it becomes less easy for them to obtain employment. This economic decay, coinciding with organic decay, is especially hard when it follows years of prosperity during which the head of the family and the older children, not yet married, put their wages in a common fund. No doubt a working-class household, in normal times, can often effect economies, but how rapidly this little sum disappears before chance misfortune! The reserves possessed by the independent and middle classes, the elasticity of their budget, the possibility of distributing their losses over an extended period and of making good later, the capability of choosing a new line of activity or of increasing profits—none of these things exist for the working class.

What we have said of the skilled workmen applies more rigor-

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ously to the semi-skilled, whose wages are lower and employment less stable, and especially to the unskilled workmen and day-labourers. Their wages hardly exceed the minimum compatible with the wants of existence; they are frequently unemployed; their health, which forms the only source of their earnings and their only competitive force, is especially vulnerable. When adversity comes there is privation and social decay, often also physical and moral decay. Eventually this class becomes merged with that of the poverty-stricken, the assisted and the submerged.

It would be easy to subdivide the social body still further. Among the independent class we might distinguish the magnates at the top of the scale from those, who, at the other end of the scale, resemble the middle class in their restricted field of action and their limited resources. In the same way we may subdivide the middle class into distinct groups: unoccupied persons living on a small income, pensioners, clerks, artisans, shopkeepers and small farmers. We may also distinguish between agricultural and industrial labourers.

If these groups exist socially they do not form a continuous series, as do, according to the condition of their members, the five main classes to which they belong. When we descend from one of these classes to another, each time life becomes more restricted both materially and intellectually; it is more monotonous and more precarious, it depends more definitely upon physical strength. These classes constitute the principal ranks of the social hierarchy, the rules of which are imposed upon us in all our acts.

Of all the official statistical services, only one has published a division of the population into social classes and calculated the birth-rates and death-rates for each class. The Registrar-General for England divides the nation into five classes—upper and middle class, intermediate class, skilled workers, intermediate workers, and unskilled workers. This classification only deals with men between the ages of 20 and 65. It estimates the upper and middle class at 2 per cent. of the population, the intermediate class at 21 per cent., the skilled workers at 43 per cent., the intermediate workers at 20 per cent., and the unskilled workers

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at 13 per cent. What we may call the bourgeois form 23 per cent. of the population of England, the working-classes 77 per cent.

The statistical year-books of Belgium, the United States and Denmark publish the occupational division of the active population, making a distinction in each group between the owners or managers and the wage-earners. The United States also separate skilled, semi-skilled and unskilled workers. Owing to these data we have been able to establish for these countries a division into social classes which corresponds approximately to that of the Registrar-General of England.¹

Social Class.	Denmark	Belgium	United States.	England
Independent class	6 } 48	2 } 38	2 } 33	2 } 23
Middle class	42 }	36 }	31 }	21 }
Skilled workmen			26 }	43 }
Semi-skilled workmen	52	62	28 }	21 }
Unskilled workmen			13 }	13 }

England is the most "proletariate" country. In Denmark the division of classes is the least unequal. In France, the workmen form only 44 per cent. of the population.

In all countries the population is divided fairly accurately among the five classes which we have described. These are also found, more or less clearly characterised, in tracing history since the period when the civil privileges of the clergy and nobility, serf-

¹ The Registrar-General includes certain employees in the independent class; we have placed these in the middle class. On the other hand, he places in the latter class, land-holders, traders and manufacturers who would appear to belong to the independent class. These discrepancies, however, hardly alter the relative proportion in each class.

According to Lewis Corey, the population of the United States, in 1929, was divided as follows:

Upper class	0 8 }
Middle class	5 7 }
Lower middle class	9 5 }
Farmers, upper group	1 3 }
" middle group	7 0 }
" lower group	7 2 }
Clerical employees	10 4
Workmen	58 1

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dom¹ and slavery² created castes rather than classes in society. However, the conditions of life in each of these classes has become considerably modified in the course of time.

La Bruyère's description of the French peasant has often been quoted. During the whole of the eighteenth century, remarks Maxime du Camp, the history of the food supply of the people is summed up in a series of periods of scarcity. France—the richest country on the Continent, has suffered from hunger till the beginning of the nineteenth century. In 1750 the peasants of Touraine were reduced to eating grass. On the 4th of October 1827, *Le Journal des Débats* inserted the following letter, signed by Charles Dupin, member of the Institut :

In Paris there is a population of 200,000 souls who produce all the works of art that we admire, who live honourably by their trade, who, by their industry, rise gradually from ease to opulence. It is more advanced than any other European population.

But there are in Paris 700,000 souls—men, women and children—who are almost as backward as the people of the Middle Ages ; half of them are unmarried and produce in bastards a third of the population.

Of these 700,000, two-thirds die in hospital ; the remaining third who die at home do not leave enough to pay for their coffins and shrouds.

Le Play, in his book on the working classes of Europe, 1855, states that the peasants of Morvan eat meat only once a year, those of Maine twice a year, and those of Brittany either not at all or only on the occasion of religious fêtes, i.e. five or six times a year. Jérôme Blanqui, in a book published in 1849 by the Academy of Moral and Political Sciences, relates that, at Lille, 3,000 families lived in cellars. The only food of the women was 4 lb. of black bread per week. "I am not rich," said an old woman, showing her neighbour lying on the damp floor of the cellar, "but I have my bed of straw, thank God !" At Lyons, some girls earned 300 francs a year, working 14 hours

¹ Austria-Hungary did not abandon it till 1848, Russia not till 1861.

² Abolished by England in 1833, France in 1848, the United States in 1862, Holland in 1863, Portugal in 1878, Brazil in 1888. The yellow slave trade, which flourished from 1859 to 1873, was no less cruel than that of the blacks.

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a day at looms where they were suspended by a strap in order to use hands and feet at the same time.

Physical and moral education of the children of labourers [continues Blanqui] does not exist in France. Conceived in suffering, born in privation and reared in filthy hovels or on the public streets, these unfortunate children often do not attain normal manhood.

In Paris, in 1882, Dr. Du Mesnil described the Clos-Maquart, where 300 rag-pickers lived in what was practically an encampment of savages; the "Cité Gand" in which 1,700 persons lodged in the recesses of a ruined building; the "Cité des Kroumirs", where homeless people hired the ground by the square metre, and lived in filth in the most complete promiscuity with domestic animals.

Since that time great progress has been effected. Especially in Holland and the Scandinavian countries, the working classes, partly by their own efforts and partly by the social conscience of the nation, have attained a degree of welfare, dignity and education which was formerly restricted to the middle classes. Given sufficient leisure, the workman seeks intellectual pleasures. He is no longer distinguished by his appearance or clothing. Hovels are no longer seen in the country-side, nor poverty-stricken areas in the towns. Starved and ragged people are no longer met with. The last slums have been condemned. A system of protection which tends to become integral, guarantees everyone from poverty. It is significant that the health of the Dutch and Scandinavian children has not suffered from unemployment, contrary to what has often been observed elsewhere.

In other European countries and in America, without reaching this level, the condition of the masses has gradually improved. The present crisis leads to a recoil which is sometimes tragic. In the United States not long ago, 1,200,000 persons were "transients", homeless and without resources. In central Europe there is often famine among the unemployed, who shun every movement to economise their forces. How shall we describe the poverty in the Jewish quarters of some Eastern European cities, and how could one picture the horrors of certain cities of the Far East, where want and degradation have descended as far as to cannibalism?

CHAPTER IV

THE BALANCE-SHEET OF SICKNESS AND DEATH

BEFORE inquiring whether health is unequally distributed in the different social classes, we have to study the subjects of longevity, mortality, morbidity and invalidism in the whole of the population.

Since the sixteenth century in Switzerland, the seventeenth century in England, and especially since 1870 in all western countries, the perspective of human existence has completely changed. The child born in England at the present day lives on an average 20 years longer than his grandfather. In New York, from 1910 to 1930 the average duration of life has increased by 9 years. On the contrary, in Egypt, in India, in China, it has hardly varied. In equatorial Africa and Oceania as a whole, it has diminished, colonisation having introduced evils, which as yet are uncompensated by the effects of hygiene and welfare measures.

The simplest method of estimating the health of a population is by calculating the *death-rate*. In London, during the seventeenth and eighteenth centuries the mortality per 1,000 was never less than 50; for the period between 1660 and 1679, the figure was 80. In the first two-thirds of the nineteenth century it exceeded 30 in all countries.

In 1932 the figures were as follows :

8.0	New Zealand	10.8	Germany
8.6	Australia	10.9	United States
9.0	Holland	11.0	Denmark
9.9	Canada	11.6	Sweden
9.9	South Africa (whites)	11.8	Argentina
10.1	Uruguay	12.0	England and Wales
10.6	Norway	12.2	Columbia (1931)

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12.2	Switzerland	17.4	Venezuela
13.1	Luxemburg	17.6	Java
13.2	Belgium	17.7	Japan
13.3	Finland	17.9	Hungary
13.5	Scotland	18.0	Greece
13.7	Latvia	18.5	Malay States
13.9	Austria	18.9	Soviet Russia (1928)
14.1	Czechoslovakia	19.8	Jugoslavia
14.1	Northern Ireland	20.3	Costa Rica
14.5	Irish Free State	20.5	Ceylon
14.7	Italy	21.1	Guatemala
14.8	Estonia	21.4	Salvador
15.0	Poland	21.7	Roumania
15.2	Lithuania	22.3	Palestine
15.8	France	22.3	Puerto Rico
16.3	Bulgaria	22.8	Chile
16.3	Spain	22.8	Strait Settlements
16.8	Philippine Islands	24.8	India (1931) ¹
17.2	Jamaica	26.1	Mexico
17.4	Portugal	28.8	Egypt

Certain regions have a still higher mortality and their populations dwindle.

The mortality, which has diminished in nearly every country—we have no statistics for Brazil, China ², Iran, Siam, Turkey, and a few other countries—is always highest in early infancy and old age. Consequently its rate for the whole population varies with the proportion of infants and old people compared with other ages. Again, the mortality in males exceeds that in females. In order to make an exact comparison of a certain country at different periods, or different countries at the same period, it is necessary to readjust the populations under consideration to a composition identical as regards the proportion of ages and sexes (*Standardised death-rates*).

This rectification produces a somewhat different figure from the gross rate, but it does not modify to any great extent the order of increasing mortality in which the different countries are classified, as is shown in the following table, giving the mortality in 1920-2 :

¹ 21.6 in British India (1932).

² In a group of 67,000 persons, Chi-ming Chiao, in 1930, found a mortality rate of 25.7 per 1,000.

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Gross Rate		Rectified Rate.	
Holland	11.5	Denmark	10.8
Denmark	11.9	Norway	10.8
Norway	12.0	Holland	11.3
England	12.4	England	12.7
Switzerland	13.3	Switzerland	13.8
Belgium	13.8	Belgium	14.1
Germany	14.8	France	14.9
Finland	14.8	Finland	15.0
France	17.5	Italy	15.6
Italy	17.6	Germany	16.5
Austria	17.8	Austria	20.8
Spain	21.9	Spain	22.6

In England the standardised death-rate has diminished with increasing rapidity since 1870 :

1841-50	21.6
1851-60	21.2
1861-70	21.3
1871-80	20.3
1881-90	18.6
1891-1900	18.1
1901-10	15.2
1911-20	13.5
1921-30	10.6
1931	10.2
1932	9.8
1933	9.9

In New Zealand it has fallen from 17.3 in 1875 to 6.77 in 1933.¹ This is the lowest in the world. From 1902-13 to 1925-7 the reduction has been 28 per cent. in Germany, 24 per cent. in England, 18 per cent. in Sweden and 12 per cent. in France.

Still more striking is the increase in *longevity*, or the average expectation of life at birth, which forms the most exact index of hygienic and social conditions.² The average length of life at Geneva was 21 years in the sixteenth century, 26 years in

¹ 7.67 according to the international standard population.

² This is the average number of years of survival from the time of birth, or, more exactly, the age at which every newborn infant would die if the sum total of years which all children born in the same year have to live was equally divided between them. The *probable longevity* is the age at which half the group under consideration has disappeared. In a population in which the proportion of the different ages is constant, these two numbers are identical. In reality, they may differ by nearly ten years, through the preponderance of certain groups of ages.

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the seventeenth century, 34 years in the eighteenth century and 39 years during the first two-thirds of the nineteenth century. In England, it rose in 1836-54 to 41 years, in 1871-80 to 43 years, in 1881-90 to 45 years, in 1891-1900 to 46 years, in 1906 to 50 years and in 1911 to 53 years. In the United States, it was 49 years in 1900, 51 years in 1910 and 55 years in 1920.

According to the most recent statistics, which are not strictly comparable, because they do not correspond to the same years, the average duration of life is 25 years in Egypt; 42 years in Japan (1921-5); 44 years in the European area of the Soviet Republic (1926-7); 46 years in Poland (1927); nearly 53 years in Finland (1921-30); 54 years in France (1920-3); nearly 55 years in Italy (1930-2); 56 years in Northern Ireland (1925-7) and in Switzerland (1920-1); 57 years in Germany (1924-6); nearly 58 years in Scotland (1930-2); 59 years in England (1923-8) and in South Africa (white population, 1925-7); 61 years in the United States (1933) and in Australia (1920-2); nearly 62 years in Denmark (1926-30); 62 years in Sweden (1926-30); nearly 63 years in Holland (1921-30); and 66 years and 6 months in New Zealand (1931).¹

In most of these countries the average duration of life has increased since 1870, for both sexes and all ages. This increase is highest in the first year of life, and diminishes progressively towards old age, except in Sweden, where it is most marked at adult age. The rapidity of this increase is such that it needs to be measured in decades, as shown in the following table relating to England, which gives the probable survival in years of both sexes at different ages :

MALES					
Years		At Birth	At 20 Years.	At 40 Years.	At 60 Years
1901-9	.	48 5	43 0	27 0	13 5
1910-12	.	51 5	44 2	27 7	13 8
1920-2	.	55 6	45 8	29 2	14 4
FEMALES					
1901-9	.	52 4	45 8	29 4	15 0
1910-12	.	55 4	47 1	30 3	15 5
1920-2	.	59 6	48 7	31 9	16 2

¹ Recent figures for Uruguay, Canada and Norway, where longevity is high, are not available.

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In Germany, the mortality also has diminished for all ages, from 1901 to 1928. In the United States, if we compare 1901 with 1930, it has diminished at all ages, except for men between 60 and 80. It is the same for France, up to 85 years, from 1896-1905 to 1925-8.

In all countries the average longevity of women is higher than that of men. In New Zealand, for example, it is 67 years 10 months for the former against 65 years for the latter. This difference is due partly to alcoholism, which is more prevalent in men than in women, and partly to the more active and exposed life of men. The mortality in young women rises when they abandon domestic occupations to become wage-earners. There is also a constitutional difference between the two sexes, which diminishes with age. In the course of intra-uterine life, the male considerably exceeds the female mortality. The organic resistance to certain diseases is distinctly greater in females during their whole life.

The study of *mortality at different ages* enables us to analyse the sanitary situation. The following figures for 1928 show the mortality per 1,000 persons of each age in France and New Zealand :

	France	New Zealand
0-4 years	27.4	10.4
20-24 „	5.4	2.8
40-44 „	7.7	4.9
60-64 „	26.5	21.0
70-74 „	64.0	53.6
75-79 „	106.7	87.0

At all ages the mortality in New Zealand is lower than that of France, which has recently reduced its infant death-rate (it remains higher than that of several other countries) but where the mortality at adolescence and middle age has only diminished slightly, for the lack of sufficiently vigorous efforts to abolish slum dwellings and suppress alcoholism (Valot).¹

It is also interesting to institute comparisons between two

¹ Male mortality at 21 years : 6.8 in France, 3.6 in England ; female at 21 years : 5.4 in France, 3.2 in England

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countries which approximate in their general death-rate, but which present a marked divergence at different ages :

	Sweden (1927).	Great Britain. (1928).
Total mortality per 1,000 inhabitants	12.7	12.3
Mortality per 1,000 persons aged		
0-4 years	15.8	21.3
5-9 "	2.1	2.5
10-14 "	1.6	1.5
15-19 "	3.2	2.5
20-24 "	4.4	3.1
25-34 "	4.7	3.6
35-44 "	5.3	5.6
45-54 "	8.9	10.2

England has the lower figures for the period from 10 to 34 years, but for the period of infancy up to 10 years, and for the period commencing at 35 years Sweden has the advantage.

Since 1850 the mortality up to 35 years has diminished by half in England. In Sweden it is the mortality between 35 and 65 which has been reduced by half. But, in 1850 the male mortality was higher in England than in Sweden up to the age of 40 years, and lower beyond that age ; the inverse of the present situation.

This reversal is explained by the following reasons : England became industrialised and urbanised before the time when social services and labour legislation were introduced. Reforms have aimed chiefly at general sanitary improvement and child welfare. In Sweden, urbanisation has been less complete, industry being localised in regions where waterfalls could supply the motive power. On the other hand, protective legislation for workers has closely followed the growth of industry. The working class has therefore been better protected in Sweden than in England (Greenwood).

The comparison of mortality at different ages shows the predominating influence of infant mortality on the general mortality rate.

At all ages, except below 9 years, the mortality is higher in the United States than in England. Nevertheless, the general death-rate of the United States is below that of England, where the infant mortality is higher.

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	Great Britain (1927).	United States (1927).
Total mortality per 1,000 inhabitants	12.3	11.5
Mortality per 1,000 persons aged		
0-4 years	21.3	17.0
5-9 "	2.5	2.1
10-14 "	1.5	1.7
15-19 "	2.5	3.0
20-24 "	3.1	4.0
25-34 "	3.6	4.6
35-44 "	5.6	7.2
45-54 "	10.2	12.5
55-64 "	21.3	25.4
65-74 "	53.6	58.9
75-84 "	127.7	139.9

It is also necessary to analyse the deaths according to their *causes*. They fall into three principal categories according as they are due to external causes, to infectious agents or to organic factors.

Deaths due to *external causes* are classified into homicides, suicides, accidents and acute or chronic intoxications by various poisons. The first are too few to influence the general mortality. The proportion of suicides is much higher, and was increasing until recent years in nearly all countries. Also, the number of accidents and of occupational intoxications has increased with the development of industry and the use of motor-cars. On the whole, external factors cause 2 per cent. of deaths in agricultural countries (Egypt, Spain, Greece, Ireland), 4 per cent. in most of the industrial and semi-industrial countries; 5 per cent. in Germany, Austria and New Zealand, 6 per cent. in the Argentine, 7 per cent. in Switzerland and Australia, 8.5 per cent. in the United States (1 death in 14), or for the last country a mortality which exceeds that of tuberculosis (1 in 15).

Among diseases due to *infections* we must distinguish :

(a) *Pestilential diseases*; plague, cholera, yellow fever and typhus. To these we may add smallpox, leprosy and rabies. These affections have disappeared from countries which take hygienic precautions. Formerly they caused immense ravages. The black plague of the fourteenth century swept away a quarter of the population of Europe. Smallpox destroyed one person

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out of ten. Asia, Africa and part of Latin America still suffer from some of these plagues.

(b) *Other infective diseases* (except tuberculosis and syphilis). Among these, typhoid, diphtheria, dysentery, malaria and hookworm are rare in countries which have adopted preventive measures. Improved treatment has also reduced the danger of these diseases, as it has done in the case of measles, scarlet fever, whooping-cough, of which the frequency has hardly diminished, but the mortality has greatly fallen. On the contrary, influenza, poliomyelitis, encephalitis lethargica, and epidemic meningitis almost completely defy our efforts. The three last diseases, however, are only responsible for a small number of deaths. On the whole, the mortality from infectious diseases (excluding tuberculosis and syphilis) has greatly decreased. In New York, for example, from 1870 to 1920 the decrease has been 84 per cent. for measles, 95 per cent. for typhoid and 97 per cent. for diphtheria. In Germany, in 1927, the mortality from scarlet fever was 63 times less than in 1881, that from diphtheria 15 times and that from typhoid 13 times less.

(c) *Tuberculosis*. A certain number of deaths due to tuberculosis are not declared as such, for different reasons. The importance of this error has diminished since we have become accustomed to greater frankness in this domain. The mortality from tuberculosis has been reduced considerably at all ages in countries which have undertaken energetic campaigns against the "white plague", and which have raised the standard of existence of the masses. In New York, from 1870 to 1920 the tuberculosis death-rate has decreased by 80 per cent.¹; in Germany, from 1881 to 1927 by 79 per cent.; in Italy, in ten years, from 1923 to 1932, it has diminished by 50 per cent. The mortality from extra-pulmonary tuberculosis has decreased surprisingly during the last twenty years.

(d) *Syphilis*. This disease is especially fatal when affecting the heart, arteries, liver, kidneys, brain and spinal cord, but statistics do not distinguish syphilitic from other affections

¹ We can also represent this progress in another way;—the mortality from tuberculosis reduced the average duration of life in the United States by 3 years in 1910, by one year in 1930.

of these organs. It is only the mortality from tabes (locomotor ataxy) and general paralysis¹ which can be definitely attributed to syphilis.

Insurance companies have established that syphilitics do not live as long as other insured persons. But the frequency of syphilis has diminished during recent years owing to more efficient treatment which prevents contagion. For the same reason, complications should have become less numerous.

Deaths due to *organic causes* come under the following categories :

(a) *Maternal mortality*, due to incidents of pregnancy and labour, constitutes, after tuberculosis, the most frequent cause of death in young women. The mortality from pregnancy (eclampsia, pre-existing disease of the heart, lungs and kidneys) is still relatively high, no doubt for want of sufficient prenatal care. The progress of obstetrics, antisepsis and asepsis have considerably reduced puerperal mortality, but since a decade, in many countries, it has remained almost stationary, owing perhaps to the sometimes fatal results of abortion, which are not statistically separated from those of labour.

(b) *Prenatal mortality* is due partly to infectious diseases (especially syphilis), partly to other causes. From 15 to 20 per cent. of infants die before the end of pregnancy. This figure was formerly higher : 35 per cent. in a group of 400 women observed at Westminster by Granville from 1808 to 1818. We must also add induced abortions, which are not registered in statistics, as they remain clandestine. In certain German towns, recently, the number of abortions exceeded that of labours, according to confidential information furnished by medical men. This proportion is probably not much lower in other countries.

(c) *The mortality of infants at birth* (stillborn children and children dying from accidents during labour) or shortly after birth (premature, deformed, debilitated or diseased children) is due to several causes : hereditary factors ; sickness (often syphilis), debility and overwork of the mother ; complications of labour.

¹ The mortality from general paralysis has decreased, which may be explained by improved treatment.

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The official definition of stillbirth, which is sometimes extended to infants which have lived two or even three days, varies in different countries, which renders international comparison inconclusive. Both in town and country it has diminished in Switzerland, Italy, Germany, the United States and New Zealand. In England, prematurity and congenital debility as causes of death are diminishing, congenital malformations hardly vary, but the complications of parturition are increasing.

There are here several factors to be considered : in Germany from 1905 to 1929 stillbirth and death during the first week have increased because the average age of mothers is higher, as well as the number of primiparæ, two elements which add to the difficulties of labour.

(d) *The mortality of infants from gastro-enteritis and broncho-pneumonia* formerly claimed, and still claim in certain countries, a host of victims. Here infant welfare has worked wonders. The example of New Zealand shows that infantile diarrhœa, which was formerly so common, can be almost completely eliminated, and a considerable reduction of the mortality from broncho-pneumonia be effected. In 1933, the mortality during the first month of life was 22·8 per 1,000 living births ; during the following eleven months, 8·8. This country, therefore, is not far from having suppressed the infant mortality due to causes acting after birth. The reduction of the ratio between the mortality of the second to the twelfth month and that of the first month indicates, as Stouman remarks, "efficiency in the use of human material." These advances, varying in degree in different countries and different districts, are due to the effects of puericulture, and to improvement in the conditions of life.

(e) *Cancer and other tumours* cause an increasingly large number of deaths, in spite of the progress of treatment, but only beyond the age of 65. This increase is still more marked after 75 years of age. As cancer is now diagnosed with greater skill and more openly admitted, the constant rise in mortality, which applies almost solely to internal cancer, is perhaps only a rectification of statistics. Again, cancer being especially a disease of advancing age, the increase in average longevity causes

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a greater number of people to attain the cancer age. Besides, the increase in cancer mortality seems to be arrested in several countries.

(f) *General Diseases.* Among these, nutritional diseases (scurvy, pellagra, rickets, osteomalacia) have diminished, or have been completely stamped out, owing to the better nourishment of the people. On the other hand, diabetes has increased, at least apparently, but this increase is limited to advanced age. It was checked by the war.¹

(g) *Chronic affections of the heart, blood-vessels and kidneys,* including cerebral hæmorrhage, embolism and thrombosis are, in about 25 per cent. of cases, of infective origin. In other cases they are due to normal or premature wear and tear of the body. In the United States, the mortality from cardiac affections is on the increase beyond the age of 25 for men and 45 for women. In England it has decreased below the age of 45 years; after this age it increases, but two-thirds of the deaths due to chronic affections of the heart, vessels and kidneys occur after the age of 65. These affections are therefore only more frequent owing to the average prolongation of life. If they now form in certain countries the preponderating cause of death, this is a victory for hygiene, in proportion as these affections occur at advanced ages. It is quite otherwise with premature affections of the heart, vessels and kidneys, due to overwork, syphilis, acute articular rheumatism or chronic intoxications.

(h) *Pneumonia*, which is decreasing as a cause of death, is especially a disease of middle age; in England one-seventh of the deaths from pneumonia occur before the age of 5 years, one-fifth after the age of 65. As regards broncho-pneumonia, in England two-thirds of the cases affect children under 5 years; the mortality from broncho-pneumonia remains stationary. Among deaths attributed to bronchitis, a certain proportion are due to tuberculosis, but two-thirds, in England, occur after the age of 65. The number of deaths from bronchitis tends to decline.

¹ This increase has been attributed to prolongation of the duration of life, to greater precision in diagnosis, to the diminution of physical effort (the use of machines, lifts, motor-cars), and to rich food. The mortality from diabetes, in England and in the United States, preponderates in older women.

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(i) Other causes of death are of less importance, with the exception of *alcoholism*. This creates or aggravates numerous affections, but only appears in statistics as cirrhosis of the liver, which may have a different origin, and delirium tremens. On the whole, alcoholism is decreasing.

In short, the diffusion of well-being, hygiene and education, the greater precision and promptness of diagnosis, the progress of therapeutics, surgery and the art of nursing, and the improvement in hospital technique have considerably reduced the general mortality, especially that from infectious diseases, which may be regarded as avoidable accidents while certain organic diseases constitute the natural causes of death. An increase in the relative, and even in the absolute number of deaths from organic diseases may be considered as a sign of progress if these occur at an advanced age, substituting themselves for the premature losses caused by infectious diseases. It must also be noted that the reduction of mortality from infectious diseases is more important from the economic and social point of view than is the reduction of mortality due to organic disease. In fact, the cancerous, the diabetics and the cardiacs often die at an age when they have finished their career and have ceased to be indispensable to their families. Infectious diseases, on the contrary, show a preference for young people, depriving society of a producer, and imposing on it the charge of widows and orphans. On the average duration of life they exert an influence more considerable than the absolute number of deaths which they cause would indicate. In 1930, diseases of the heart reduced the average longevity of the whole of the population of the United States by $2\frac{1}{2}$ years; cancer by $1\frac{1}{2}$ years and tuberculosis by 1 year (Dublin).

The decrease in mortality from infectious diseases is remarkable. In London from 1771 to 1780 they were responsible for 46 per cent. of the deaths; in 1929, for 17 per cent. in England and 10 per cent. in New Zealand, compared with 75 per cent. in India.

These data need some amendment. Certain diseases which we have included under the heading of organic causes are sometimes of infectious origin; for instance, visceral affections due

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to syphilis, endocarditis, etc. The rate attributed to infectious causes should therefore be raised by about one-third. The increasing preponderance of deaths from organic causes over those from infectious causes, however, remains an established fact.

The progress realised is greater than what our figures indicate. To estimate the diminution of deaths due to different causes, it is necessary to investigate, not how much per cent. they make out of the total number of deaths—which has diminished—but how many deaths they cause per 1,000 inhabitants.

This is shown in the following table :

Mortality per 1,000 Inhabitants	London * 1771-80.	England, 1929	New Zealand, 1929.
External causes	— 0 5	— 0 5	— 0 7
Infectious causes	— 23	— 2 0	— 0·8
(Of which tuberculosis) . . .	11 —	0 8 —	0 4 —
Organic causes	— 26 5	— 9 2	— 7 0
(Of which cancer	— —	1 3 —	1 0 —
Wear and tear	— —	3 9 —	3 1 —
Other affections)	— —	4 0 —	2 9 —
Total	— 50 0	— 11 7	— 8·5

* According to Farr.

It appears that the mortality due to external causes has not increased after 150 years, in spite of the machine and the motor-car; but for one death from tuberculosis in England to-day, there were 14 in London towards the end of the eighteenth century; for one death from infectious disease there were 11; for one death of organic origin—here the advantage could not be so considerable—there were 3. In New Zealand the comparison is still more favourable.

Other figures give an idea of the reduction of mortality which has taken place in young people. From 1730 to 1749, out of four children born in London only one reached the age of 5 years; from 1790 to 1809 one out of two; at the present day 89 per cent. of children born in London pass the

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age of 5 years. In New York, from 1870 to 1920, the general mortality has been reduced by 61 per cent., the mortality of children under 5 years of age by 81 per cent. On the contrary, in northern Labrador and among the Esquimaux half the children die before the age of 2 years. In the Belgian Congo and in Gambia, among the negroes, 50 per cent. of the children die before the age of 13 years (Rodhain).

It is a remarkable fact that the conquests of hygiene have been obtained in spite of increasing industrialisation and urbanisation, which create serious dangers to health. In the United States, but not in England, the urban mortality does no more exceed the rural. The infant mortality is actually lower in the towns than in the rural districts in Germany, Denmark, Finland, Holland, Sweden and Switzerland. From infancy to the age of 40 years, the rural mortality nearly everywhere preponderates, especially in females, as regards tuberculosis, influenza, bronchopneumonia and infectious diseases of children. After the age of 40 the rural districts have the advantage (Stouman).

These figures, however, do not convey to the mind a true impression. As Professor Winslow says,

If we had but the gift of second sight to transmute abstract figures in flesh and blood, so that as we walk along the street we could say—"that man would be dead of typhoid fever", "that woman would have succumbed to tuberculosis", "that rosy infant would be in its coffin"—then only should we have a faint conception of the meaning of the silent victories of public health.

Statistics of *morbidity* have neither the amplitude nor the precision of tables of mortality. Only Soviet Russia, where all patients are treated by an organised medical service, could furnish complete data. However, important conclusions can be arrived at from the reports of the public health services (notification of infectious diseases), from the school medical service, from the Army, the hospitals and the social insurance funds,¹ and from special investigations. By these means we know

¹ The Scottish Board of Health, since 1930, has collected statistics of morbidity among the insured population. These include the sex, age, occupation and residence of the insured.

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that, on the average, every individual is ill for about 10 consecutive days once a year. Excluding illness lasting less than a week, each person suffers from an illness of 20 days' average duration every other year. In other words, out of 100 persons, 3 are incapacitated from work every day by various diseases. In the United States, 1 person in 100 is always under treatment for venereal diseases, 1 in 200 for tuberculosis, and 1 in 400 is interned for mental trouble.

In England, in the insured population, one-quarter of the total number of cases of illness is constituted by slight diseases of short duration, one-quarter by bronchitis or pneumonia, one-sixth by digestive disorders, one-sixth by rheumatism, and one-sixth by other affections (Sir George Newman).

In 9,000 American families, including 39,000 persons observed between 1928 and 1931, Collins has found that for each year there were 823 cases of sickness per 1,000 individuals; 492 necessitated domiciliary treatment. In 413 cases the patient was confined to bed. In 41 per cent. the respiratory system was affected (catarrh, bronchitis, sore throat, influenza, pneumonia); 10 per cent. were digestive disorders; 9 per cent. were the result of accidents; 9 per cent. were infectious diseases, including tuberculosis and syphilis; 5 per cent. were cases of parturition, abortion or affections of the female genital tract; 4 per cent. were skin diseases; 4 per cent. cancer, diabetes and other general diseases; 4 per cent. diseases of the circulatory system; 3 per cent. affections of the nervous system, including cerebral hæmorrhage; 2 per cent. diseases of the ears; 9 per cent. other diseases.

The proportion is nearly the same among insured persons in Scotland, except in the case of rheumatism, which is responsible for 11 per cent. of sickness.¹

In Germany (1926), according to Roesle, morbidity was caused for one-quarter by neurasthenia, one-quarter by influenza

¹ In England, the sums allocated for rheumatism by the National Health Insurance represent one-sixth of the total, or 20 million pounds a year. In Sweden, rheumatics form 6 per 1,000 of the population and cost the public funds double the sum which is dispensed for the tuberculous. In Germany, 75 per cent. of industrial workers over 40 years of age suffer from rheumatism.

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and bronchitis, one-quarter by rheumatism in men and anæmia in women, one-quarter by other affections.

Morbidity rises up to 6 years of age, then diminishes up to 15; towards 20 years there is a slight rise; the increase becomes more rapid after 35 years of age. In contrast to mortality, morbidity affects females more than males, except before the age of 10, when this state is reversed. Among the insured population in Scotland, the average number of days of sickness per annum is 8 for men, 10 for unmarried women and 23 for married, among whom this excess of morbidity is not due to gynecological affections or to parturition, but to anæmia, debility, varicose veins and their complications, etc.

According to inquiries pursued in Massachusetts, chronic diseases affect 12 per cent. of the population (rheumatism 3 per cent., cardiac diseases 2 per cent., arteriosclerosis 1.5 per cent., disorders of the alimentary system 0.7 per cent., affections of the eyes and ears 0.6 per cent., the results of apoplexy 0.6 per cent., tuberculosis 0.6 per cent., diabetes 0.4 per cent., cancer 0.3 per cent., etc.), causing partial incapacity for 6 per cent. of the population and total incapacity for 0.6 per cent. (Bigelow and Lombard).

It is estimated that there are 100 cases of sickness to one death. The most frequent causes of morbidity are not those which result in the greatest number of deaths.

The comparison of morbidity with mortality, based on the observation of 7,200 persons during a period of twenty-eight months, at Hagerstown (Maryland), reveals remarkable contrasts. Affections of the respiratory organs caused 20 per cent. of the deaths while they represented 60 per cent. of the affections observed.¹ On the other hand, affections of the circulatory system caused 35 per cent. of the deaths, but only 3 per cent. of the cases of sickness. This is because, in contrast to pulmonary affections, diseases of the heart and vessels remain latent for a period which may extend to ten years or more.

Affections of the alimentary system cause 6 per cent. of deaths

¹ The common cold produces on an average $2\frac{1}{2}$ days of incapacity per person per annum, which in the United States leads to an annual loss of 1,500 million dollars.

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and 10 per cent. of morbidity cases ; contagious diseases, 2 per cent. of deaths and 8 per cent. of morbidity (Sydenstricker).

The rapid diminution in mortality, which we find in most countries, is accompanied by a parallel diminution in morbidity only in respect to infectious diseases and those peculiar to infants. We should devote our attention more to organic diseases and to middle age, for it is not sufficient to extend the duration of life, it is necessary to cultivate and protect health.

Fitness, or physical and mental vigour, is less general than is commonly believed. Sir George Newman sums up the results obtained fifteen years ago from the medical inspection of school children as follows : out of 7 million children aged from 5 to 14 years, one million escaped inspection, either because they did not attend the Council schools, or because chronic affections detained them at home. Moreover, one million suffered from chronic diseases or disabilities sufficiently severe to necessitate their removal to special schools or to deprive them of the normal benefits of school attendance. Among the other 5 million, one million exhibited affections requiring medical or surgical treatment. At least 3 million needed dental treatment.

The Conference called together by President Hoover in 1930 estimated that out of 45 million American children 35 million showed no other defects than dental caries, adenoid vegetations or enlarged tonsils. Of the other 10 million : 6 million were ill-nourished, one million had speech defects, one million had cardiac affections, 675,000 presented grave defects of character, 450,000 were mentally deficient, 382,000 were tuberculous, 342,000 had defective hearing, 18,000 were totally deaf, 300,000 were debilitated, 50,000 were partially blind, 14,000 completely blind, 200,000 were delinquents.

In the United States 3,500,000 recruits from 18 to 20 years of age were examined in 1917 and 1918 ; 53 per cent. were found to be in good health, 26 per cent. mediocre, and 21 per cent. unfit even for sedentary service.

In general, these anomalies increase in frequency and in intensity with age. In 1919 the number of English recruits

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declared as unfit was 22 per cent. at 18 years of age, 48 per cent. at 23, and 69 per cent. at 40 years of age (Govaerts). The same rapid rise with age has been observed elsewhere. According to an investigation carried out in Massachusetts, chronic diseases affect 2 per cent. of the population up to the age of 19 years, 6 per cent. from 20 to 39 years, 21 per cent. from 40 to 49 years and 40 per cent. over 50 years of age (including rheumatism 10 per cent., arteriosclerosis and cardiac disease 9 per cent.) (Bigelow and Lombard).

The majority of these disabilities can be avoided or cured, as is shown by the experience of school medical services. For instance, at Bonn, dental caries no longer exists among school children. Institutions which undertake preventive medical examination are able to correct more than half the anomalies discovered.

These examinations, which are extending in many countries, as well as investigations bearing on groups of wage-earners or employees, show that out of 100 persons apparently healthy, 5 at the most are in a state of perfect health, 25 require improvement in hygiene, and 70 need medical, surgical or dental treatment (Emerson).

The examination of 16,662 persons insured in the Metropolitan Life Insurance Company classifies the principal anomalies found as follows: 55 per cent. presented dental affections, 54 per cent. defects of vision, 54 per cent. gastro-intestinal disorders (14 per cent. gastric troubles, 36 per cent. constipation, 4 per cent. both gastric troubles and constipation), 26 per cent. chronic affections of the tonsils, 19 per cent. arteriosclerosis, 19 per cent. faulty posture, 16 per cent. flat foot, 16 per cent. nervous troubles, 15 per cent. defects of hearing, 13 per cent. obesity, 12 per cent. hæmorrhoids, 10 per cent. chronic affections of the skin.

As regards the intellectual level, it is estimated in the United States that 15 per cent. of the population do not surpass the mental level of 12 years; among these 10 per cent. present only slight inferiority; 3 per cent. are mentally defective, but able to take their place in life; 2 per cent. have marked mental deficiency (up to imbecility and idiocy) and require more or less constant supervision.

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As regards conduct, 1 per cent. of the population of the United States are delinquents¹; 5 per cent. at least exhibit marked anomalies of character and conduct.

Defects in physical health, intelligence and character often coincide in the same individuals. For Belgium I have estimated the proportion as follows: Severe physical incapacity 0.2 per cent.; partial physical incapacity 1 per cent.; severe mental incapacity 0.3 per cent.; partial mental incapacity 10 per cent.; chronic patients incapable of work 1 per cent.; constitutional debility 20 per cent.; acquired debility (from tuberculosis, cardiac disease, etc.) 10 per cent.; debility due to old age 7 per cent. In short, nearly 50 per cent. exhibit physical or mental defects,² and 50 per cent. are free of them, but even these, as we have seen, do not, in general, enjoy perfect health.

In some countries the situation is much worse. In India, with 350 million inhabitants, 150 million are affected with hook-worm and 100 million with malaria, debilitating diseases which considerably reduce the capacity for work. One-and-a-half million are totally blind. The number of persons affected with malaria in the whole world has been estimated at 700 million, about one-third of humanity, the number of persons suffering from trachoma at 500 million, and the number of lepers at 2 million.

Syphilis, tuberculosis, sleeping sickness, yaws and many other diseases still sap the vitality of some nations, to the extent of producing physical, economical and social decay, to which, not improbably, the ruin of former flourishing civilisations may be attributed. On the other hand, in countries which have made hygienic and social efforts the physical condition has improved. During the last fifty years the average height of school children and of army recruits has risen by an inch

¹ In Belgium, among males over 15 years of age, 1 per cent. are convicted yearly by the courts for misdemeanours or more serious offences.

² Without counting those invalided in the war. In some countries the number of the unfit is greater. In Palestine there are 8 blind persons per 1,000, instead of 1 per 1,000 in most other countries. Deaf-mutes may also reach a high percentage.

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or more in the United States and in most of the western and central countries of Europe.¹

We can understand better the ravages due to disease and death by taking as a starting-point a definite number of new-born infants and following them up for twenty years. This is expressed in the statistics of the National Office for Social Health in Paris :

Male infants born in France in 1894 . . .	436,000
Died before 1914	118,000
Unfit for military service in 1914 . . .	96,000
Healthy in 1914	222,000

Thus, of two infants born in 1894, one only reached the age of 20 in good health.

If we take into account the intra-uterine mortality (excluding induced abortion) the rapidity with which human material is wasted becomes still more striking.² In forty years, at the actual rate of mortality and morbidity in France, of 100 infants conceived within the year, 40 would be dead, 30 would be more or less unfit and 30 only would enjoy good health.

The situation is more favourable in other countries. In the United States, on the basis of the mortality in 1926, of 10 infants born alive :

9 would reach the age of 13 years (12 years in France)	
8 " " " " 40 " (24 " ")	
7 " " " " 53 " (44 " ")	
6 " " " " 60 " (56 " ")	
5 " " " " 66 " (63 " ")	
4 " " " " 70 " (69 " ")	
3 " " " " 74 " (74 " ")	
2 " " " " 78 " (78 " ")	
1 " " " " 83 " (82 " ")	

¹ But the weight and respiratory capacity are not always increased in the same proportion, and are sometimes diminished. This is especially true for the years following the war.

² From 15 to 20 pregnancies terminate by spontaneous abortion. In France, for 100 living births, there are 4 stillbirths.

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According to Dublin, we could easily bring to pass that, of 10 infants born alive :

9	would	reach	the	age	of	30	years
8	"	"	"	"	"	50	"
7	"	"	"	"	"	60	"
2	"	"	"	"	"	80	"

The average survival at birth would then be 65 years (in New Zealand it is actually over 66).

When we shall have prolonged the average duration of human life—and it is not too much to predict that some day the expectation of life at birth may be 70 years—it will no longer be the mortality, but the morbidity which will be the index of public health.¹

Social progress is not limited to the saving of human life ; it is concerned with the preservation and development of health and vitality, and consequently with productiveness on the one hand, and with happiness on the other.

But, in primitive populations, such as the Koeboes of Sumatra, man at 30 years of age is old and toothless, and at 40 a completely stiff-jointed invalid (Collet). Molière called 40 the age of dotage, and the heroines of Balzac abdicated before that age.

Another method of visualising the importance of a disease consists in estimating the number of persons affected by it at any period of life. By this means we obtain striking results (Emerson). In the United States 1 person out of 3 is affected, sooner or later, with a disease of the heart, arteries or kidneys ; 1 in 5 is of feeble constitution ; 1 in 5 or 7 suffers from definite tuberculosis in the course of his life ; 1 in 10 from rheumatism ; 1 in 12 from cancer ; 1 in 10 to 20 from syphilis ; 1 in 20 from nervous or psychopathic troubles which play havoc in his or her life ; and, apart from these cases, 1 in 22 ends his days in a lunatic asylum, and 1 in 24 commits at least one grave misdemeanour during his life.²

Other less severe affections are still more prevalent ; 8 or

¹ We are not here concerned with the question whether the maximum duration of human life can be prolonged, as some believe, by the administration of glandular extracts or by any other method.

² In Belgium 1 person in 40 or 50.

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9 persons out of 10 have had measles ; in certain communities about 8 men out of 10 have been infected with gonorrhœa ; influenza, scarlatina and whooping-cough are about as frequent. Dental caries affects nearly all children, and pyorrhœa nearly all adults. Affections of sight and hearing are hardly less universal, at least among old people.

In spite of the progress of medicine, hygiene, education and welfare, the ravages of disease and invalidism remain considerable.

Human life is beyond all price, and there is no monetary equivalent for suffering. We can, however, establish the *cost of disease* and determine the productive value of man, which has been called human capital.

Freudenberg, at the beginning of the present century, estimated that sickness cost each year 3·200 million marks in Germany, in attendance, assistance and loss of wages :

544	millions	for	respiratory affections
499	"	"	infectious diseases (224 for tuberculosis)
474	"	"	accidents
373	"	"	affections of the alimentary tract
239	"	"	affections of the nervous system, eye and ear
133	"	"	circulatory affections
48	"	"	urinary affections
24	"	"	tumours

The human capital lost every year by death was evaluated at 10·500 million marks :

2,994	millions	for	infectious diseases (2,332 for tuberculosis)
2,045	"	"	circulatory affections
1,339	"	"	tumours
1,040	"	"	respiratory affections
742	"	"	digestive affections
572	"	"	accidents
497	"	"	urinary affections
372	"	"	affections of the nervous system, eye and ear

Here again, but this time from the economic and social standpoint, diseases rank in a different order according to their effects on the sickness-rate and on the death-rate. The age at which the different fatal affections occur constitutes one of the essential factors of the social waste they cause.

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Brouardel and Arnaud have estimated the losses and expenses caused every year in France by tuberculosis at 15,000 million francs. If France reduced its tuberculosis death-rate to that of Denmark, this tribute would be halved.

Venereal diseases cost the inhabitants of the St. Louis county more than two dollars per head a year, without reckoning the loss in productiveness (Loeffler).

Mental affections in the United States cost 208 million dollars a year for treatment and assistance; 534 millions loss in productiveness (Pollock).

Chicago spends annually 750,000 dollars in vainly trying to instruct children affected with untreated dental caries; while Atlanta, by means of its dental service, has reduced from 32 to 8 per cent. the number of school children incapacitated by this cause.

The total loss caused by disease has been calculated for England by Freemantle, for the United States by Homer Folks. In England, the cost of treatment, sickness allowances and relief for patients and their families, and present and future diminution of production, is 300 million pounds sterling (out of a national income of 3,800 million pounds); in the United States, more than 15,000 million dollars (out of a national income of 90,000 million dollars); in the first case 8 per cent., in the second 17 per cent. of the national income.¹

Every healthy individual represents capital for the nation, since, by his manual or intellectual work, he produces more than he costs. The human capital of the United States is worth 1,500,000 million dollars, five times the material capital of the whole population, in personal and real estate, which in 1922 was 321,000 million dollars (Dublin and Lotka). It is noteworthy that Nicholson, in 1891, in making a similar evaluation for England, also found the value of the human capital to be five times that of the material capital. The preservation and development of human capital by education, assistance, health organisation and insurance therefore justify, from the economical

¹ Previously, Dublin estimated the cost of sickness in the United States at 6,000 million dollars, out of an income of 63,000 million, or 10 per cent.

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standpoint, what has been incorrectly termed the social charges of our budgets.

Prevention costs less than cure. We can inoculate 50 children against diphtheria for the same sum which represents the cost of hospital treatment for one diphtheritic patient. It costs four times less to rear the child of a consumptive in a healthy family than to treat it, with an uncertain result, after it has become infected. It is more economical to obtain healthy housing for a family than to treat those of its members who have become infected with tuberculosis in slums¹; for, as Armand Delille has remarked, in order to restore to society a cured consumptive (uncertain capital) it is necessary to look after three, which, with their maintenance and that of their families, costs 100,000 francs.¹

Health pays. According to the report of the Metropolitan Life Insurance Co., which from 1909 to 1927 spent 32 million dollars to teach health habits to those it had insured, the reduction in mortality has resulted in a saving of 75 million dollars. The Company has therefore recuperated its expenses, plus 134 per cent. profit.

The Health Centre of East Harlem, in ten years, cost 300,000 dollars. In comparison with other quarters of New York, the mortality has been reduced; 2,000 human lives have been saved, the economic value of this saving is estimated at 20 million dollars (Widdemer). From 1920 to 1931, the County Health Service of Los Angeles cost 6,700,000 dollars; the reduction of infantile mortality and of that from smallpox, diphtheria, typhoid and tuberculosis led to a saving of human life worth 45 million dollars. On the other hand, in Salem (Ohio), an apparent economy of 1,500 dollars was effected by laying down drain pipes of inferior quality. This resulted in an epidemic of typhoid, leading to expenses and loss of human life valued at half a million dollars.

It may be objected that the economic value of human life

¹ In the distribution of relief to families in New York before the crisis, 33 per cent. was apportioned to the tuberculous; 41 per cent. of widows assisted lost their husbands on account of tuberculosis, and 42 per cent. of orphans lost their father from the same cause.

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is open to question ; if we are unable to find employment for those out of work they represent a burden, at least temporarily. But death itself is a burden to society ; in the United States, in 1930, there were 3 million orphans under 17 years of age. At the mortality rate of 1901 there would have been 5 million (Dublin).

Let us examine the rapid and effective results which can be produced by health organisation. In the Malay States, a district was cultivated without any sanitary precautions being taken other than medical attendance of the sick. The results were not encouraging ; the seven Europeans in charge of the enterprise were almost constantly in ill-health, they could not dream of marrying and founding a family, and their only distraction was alcohol ; the 870 coolies under their charge were practically human wrecks ; there were no gardens, no domestic animals, no children.

Hygienic measures were then introduced. A few years later, four Europeans were sufficient for the task ; three are married and each has a child ; they live soberly ; 450 healthy coolies cultivate vegetables and raise cattle and chickens ; 220 children play about in their village. The mortality of the personnel fell from 232 to 3 per 1,000, the annual number of admissions to hospital from 1,084 to 275. Formerly £12,000 were spent each year for medical care. This expenditure has fallen to £6,000 ; but £9,500 are devoted to preventive measures. By the reduction of manual labour the budget of the enterprise was reduced from £240,000 to £145,000, the net cost fell by five-sixths, and nine times more rubber was produced than before.

No doubt this is an extreme case, because, in a new country, hygiene and social service pass through in a few years the stages which Western nations have taken a century to traverse. The sanitary improvement of the Panama Canal zone, directed by Dr. Gorgas, during seven years economised 80 million dollars and spared 71,000 human lives.

Even in countries which have for a long time carried out health measures, certain contrasts show the benefit resulting from the protection of human life. We might believe ourselves

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carried from one world to another when we pass from the garden city of Port Sunlight to the adjacent town of Liverpool, or in France from one of the garden cities of the Northern railway company to the surrounding agglomerations. The companies who have created these conditions of existence find them a source of profit.

For evils which we have not yet succeeded in preventing, curative action is in itself an economy in a great number of cases. Ten tuberculous subjects, treated for five years, cost £1,935; when placed in a working colony they earned £3,926 in four years (MacDougall). A thousand invalids having been trained at the cost of 300 dollars a head, their yearly earnings increased on the average by 1,000 dollars (Lapp). One hundred and twenty-two mental defectives of school age were taught; seventeen years later only 10 per cent of them required assistance.

In Paris the hospital social service, in 1932, prevented 48 infants from being abandoned by their mothers. Each abandoned child would have cost 30,000 francs till its majority, thus 1,440,000 francs were saved to the public assistance budget (Getting and Rist). At Nuremberg, the social service reduced the average stay in hospital from 29 to 23 days. In one year, at Brussels, the preventive assistance of vagrancy diminished by nearly 1,000 the number of persons sent to the welfare settlements; an economy of several millions a year, realised by a service whose budget is less than 50,000 francs.

The earlier the intervention, the more is it effective and economical. An invalid child, treated during the first years of its life, will attend school and become a useful citizen; treated from the age of 12 only it will have suffered much, its education and capacity for work will be incomplete, and its treatment will cost twenty times more.

Sociological medicine and social service may thus be eminently productive. Some complain of their cost, but at the time when the United States allocated 60 million dollars to health services, 107 millions were spent on perfumes and cosmetics, 92 millions on chewing-gum, 805 millions on sweets, and 1,823 millions on tobacco—to say nothing of alcoholic drinks.

Time, giving the lie to short-sighted predictions, has confirmed

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the three aphorisms which Jules Rochard enunciated in 1888 : Every judicious expense incurred in the name of hygiene is an economy ; nothing is more expensive than sickness, unless it be death ; of all waste, that of human life is the most ruinous.

We are led to attribute to hygiene, taking this word in its widest sense, the progress realised in the domain of public health. This opinion, however, has been contested, and some maintain that factors which have escaped our notice play an important part. Brownlee, for example, considers that the virulence of tuberculosis is subject to variations extending over several hundred years. The hygienists of former centuries were aware that the spread and toll of a disease are liable to fluctuations, which they called the " epidemic genius ". Nowadays we speak of changes in virulence or in the types of bacteria, of mixed infections, of progressive immunisation of the population, or of the presence of non-immunised elements.

However, these factors do not come into question when in forty years, Denmark, where the mortality from tuberculosis was originally high, came to have the lowest tuberculosis death-rate in Europe ; when, in the course of a five-years' intensive local campaign, the mortality from tuberculosis was reduced by 68 per cent. at Framingham, but by 30 per cent. only in the surrounding districts ; when, at Lyons, the decrease in tuberculosis is more rapid in quarters served by numerous dispensaries than in the other parts of the town ; when children, separated from tuberculous parents, remain healthy, with only rare exceptions ; when, among 17 million persons insured in the Metropolitan Life Insurance Company, the mortality from tuberculosis diminished by half in ten years (1916-25) ; when in Denmark free arsenical treatment and the strictly enforced notification of syphilis reduced the number of fresh cases of this disease from 4,500 in 1919 to 700 in 1933, for a population of 3,500,000.

The evolution of infant mortality offers arguments which are no less irrefutable. In 1893, Morel, the mayor of Villiers-le Duc, gave a gratuity to mothers whose children were in good health at the age of one year ; the infant mortality which was then 22 per cent. fell to 0 between 1897 and 1900. At Peiping, the infant

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mortality, which exceeded 20 per cent., fell to 14 per cent. in the Health Centre District. At Charlottenburg, the granting of an allowance to mothers who suckled their infants led to the general adoption of suckling, with the result that the infant mortality did not rise during a heat wave which claimed numerous victims in other areas. The same measure at Neukölln, another suburb of Berlin, reduced the mortality among illegitimate infants to the mortality rate of the legitimate. In the fifteenth *arrondissement* of Paris, in which the service of the School of Puericulture has been at work since 1918, the number of stillborn infants, which hardly varied elsewhere, fell in ten years from 76 to 27 per 1,000 births.

The Framingham Demonstration was directed only against tuberculosis; however, the infant mortality diminished by a third in the course of this campaign, because public attention cannot be drawn to a definite disease without benefits in every field of health.

Having shown the effects produced by hygienic measures, we must not forget the part played by medical progress, hospital organisation and the art of nursing. Especially, we must not ignore what is due to improvement in social conditions. In Italy, during twenty years, a striking agreement has been noticed between the variations in mortality and those of wages. In the same country, the gradual increase in the average height of recruits mirrors local economic and sanitary progress. In Norway, and elsewhere, the decrease in tuberculosis is greatest in regions where the standard of life is highest. At Panama, after having conquered yellow fever and malaria by sanitation, Dr. Gorgas succeeded in suppressing pneumonia by increasing wages. This influence of welfare explains why the tuberculosis death-rate began to fall before the campaign against this disease was undertaken.

One great objection which has been raised against hygiene and social action in general is that their intervention paralyses natural selection, which some consider as the bulwark of the species, and a decisive factor in all progress. According to this view, the efforts of hygienists and philanthropists are, to a certain

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degree, vain, when selection, the influence of which they have succeeded in temporarily suspending, regains its rights; and calamitous when they save stocks and individuals which in the interests of the community should be sacrificed.

As an example of what may be called the revenge of natural selection, we may mention the argument that the reduction of mortality in early infancy results in a rise in the mortality of children from 2 to 5 years of age. This argument has been definitely refuted.

Crum established that before 1920, in Dutch towns of over 100,000 inhabitants, the mortality of early and later infancy diminished on parallel lines, and that their curves were divergent in rural areas where child welfare did not exist at that period. We see here the contrast of the two methods; in rural districts selection eliminated the weakly from an early age, but also infants who were the victims of circumstance, while in the towns child welfare organisation reduced the mortality at all periods of infancy. In England, from the period 1871-5 to the period 1921-5, the mortality was reduced as follows :

From 153 to 76 per 1,000 infants of less than a year				
" 59 to 21	" "	" "	" "	" 1-2 years
" 28 to 9	" "	" "	" "	" 2-3 "
" 19 to 6	" "	" "	" "	" 3-4 "
" 14 to 4	" "	" "	" "	" 4-5 "

In New York (Manhattan and Bronx), from 1900 to 1925, the mortality of infants under one year has diminished by two-thirds, that of children from 1 to 4 years old by five-sixths. This improvement also applies to adolescents and adults. In France, the number of individuals of 20-39 years has increased since 1851 in the same proportion as the general population, but the increase has been more marked between the ages of 40-59 years, and still more after this age. Allowing for the increase of the population, there are now in France half as many more octogenarians as there were in 1851.

In face of these facts another objection has been raised, namely the danger of a continued increase in the undesirable fraction of the population, in support of which impressive figures are quoted : From 1880 to 1920 the number of insane in the mental hospitals

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of the United States increased from 81.6 to 220.1 per 100,000 inhabitants, and this increase is found in most other countries. But the diagnosis of mental affections has made considerable progress, hospitals devoted to their treatment have multiplied and their administration has been improved. It is now recognised that these hospitals are not only asylums for the incurable, but also centres of treatment; prejudices against entering these institutions are giving way; consequently admittance to mental hospitals is now more frequent and at earlier stages of disease, and owing to improved treatment the life of the insane is prolonged.

Thus the number of inmates of these institutions may have grown without any real increase in the frequency of mental disease. In support of this opinion is the fact that, in England, no increase has been established in the number of patients admitted for the first time to a mental hospital (446 per million inhabitants in 1879; 494 in 1899, 525 in 1919, 448 in 1926), although this is not the case in other countries, for the reasons stated. Besides the mortality among mental cases has diminished.¹

To other objections we may give a similar answer. Pauperism has considerably diminished in all civilised countries, abandoned infants are less and less numerous, and if criminality has assumed other aspects without greatly diminishing during the last fifty years, it remains much less prevalent than in former centuries.²

That the moderns have not degenerated in comparison with the ancients is proved, from the physical standpoint, by a comparison of the records beaten in our Olympic Games, with the prowess of the Greek Olympian contests; from the intellectual standpoint, by the group of scientists who have revolutionised our ideas of matter, energy, time and space; from the collective point of view by the material and spiritual productiveness of contemporary nations, the moral qualities manifested by peoples and individuals in war as well as in peace, and by the fortitude

¹ Mortality in England: for general paralysis, 61 per million inhabitants in 1911, against 30 in 1931; for other forms of insanity, 38 in 1911, 28 in 1931.

² In France the number of persons convicted at the Assize Courts was 0.11 per 1,000 inhabitants in 1873-7, 0.04 in 1920-4. For the other criminal courts the corresponding figures are 5.06 and 5.18.

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with which they have now for twenty years borne trials which might well have led to despair, or at least to discouragement, by their severity, their repetition and their duration.

Natural selection is therefore not indispensable for the health of the race. By haphazard, brutal and expensive methods, in eliminating the tares it sacrifices at the same time part of the good grain.

To replace this wasteful method by a less blind action constitutes not only a moral, but also a biological advance, comparable to that realised by mammals over fishes ; the former rear a small brood with care, the latter lay millions of eggs, most of which perish.

Why resort to the most primitive methods of nature when it shows us that among animal life the species and the individual do their utmost to defend themselves against the perils which threaten them. Do not the animals seek a more favourable haunt when their surroundings are too inclement, do they not change their habits if they find it advantageous, and often associate with one another for their mutual benefit ? Some do not sacrifice those of their young which show signs of weakness or invalidity. They help each other when they live in common. Why would it be wrong for man to use the same solidarity and initiative ?

Facts have decided between the selectionists and the interventionists. For thousands of years smallpox destroyed a tenth of humanity, which was in no way immunised against this plague. The discovery of vaccination and its general application were sufficient to effect in a few decades that which selection had failed to accomplish in the course of many centuries.

Of the two methods, that which requires an immense sacrifice of victims to enable us to resist all the harmful influences of environment, and that which, founded on science and on foresight, wards off the dangers which surround us, the second is the more humane, the more certain and rapid. The first method regards death as a selective agent, saving the good and sacrificing the bad. It is true that death eliminates beings which are inferior from the biological point of view, but in the majority of cases it strikes blindly ; a healthy child becomes tuberculous if it lives in close contact with a consumptive who does not take the

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necessary precautions ; a healthy man is undermined by malaria if he does not defend himself against mosquitoes ; a normal infant dies from gastro-enteritis if his diet is faulty. Selection by negligence and ignorance is not natural selection.

No doubt a strong constitution enables some to resist while others perish. However, typhoid, syphilis and cancer make no distinction between the weak and the strong. And what of the weakly infants who become robust old people ! The dangers which menace health are often temporary and accidental ; for example, excessive summer heat for infants. Is it not reasonable to help them on their journey ? In New Zealand, which has been most successful in this respect, the infantile mortality, reduced to the point of being selective, has ceased to be destructive (Stouman).

It is also necessary to bear in mind that the causes of mortality are at the same time factors of invalidism. To leave the field open to disease means losing more in the creation of invalids than we gain in eliminating the weak.

Lastly, even if death were always selective, this would only apply to physical fitness, which is no longer the only object at which men aim. We need intelligence, talent and character just as much as physical vigour. Apart from a small proportion of individuals manifestly damaged, we can hardly point out those whose elimination would be desirable, the individual mixture of good and bad qualities being too complex. When we breed sheep for their wool, it is easy to select the animals whose fleece is most abundant, but what is the criterion for the human race ?

Those who criticise the results of hygiene and social medicine confine themselves to generalities. What is their object ? to suppress physicians, hospitals, sanatoriums and health services ? to leave the aged, the poor, the sick, the physically and mentally afflicted to die without aid ? never to cure or prevent when we possess the means of doing so ?

The experiment is made. There are still countries which have no hygiene and no social assistance ; they are those in which we find the greatest number of sick and infirm ; they are those in which economic, intellectual and moral development is slowest.

CHAPTER V

PHYSICAL AND MENTAL INEQUALITY BETWEEN THE SOCIAL CLASSES

IN the populous suburbs of towns and in industrial areas, the children are generally smaller, paler and more puny than in the richer quarters.¹ Men and women of the labouring class age prematurely. We can easily recognise these "class types", drawn by artists and described in literature. Characteristics, such as heavy features, prominent jaw and receding forehead, were already noted in Diderot's and d'Alembert's *Encyclopédie*.

The scientific study of these social differences is hardly a century old; earlier, the proportions of the human body were mainly the concern of the sculptors. But these "artistic canons" are founded on an æsthetic conception which often departs from reality; in their modelling of the human body, the Greeks systematically reduced the dimensions of the head, hands and feet.

Anthropometry, on the contrary, aims at exactness. Founded by Quételet and developed by Galton and Lombroso, it measures with precision the different parts of the human body, to study their variations and reciprocal relations. Under the name of *biometry*, it has been extended by Karl Pearson and his followers to the quantitative study of the various features observed among living beings in general.

In 1829, Villermé demonstrated that the average stature of a population increased with its welfare. After him, Quételet, Dufau, Bertillon senior, and Roberts created *social anthropometry*, which, with the addition of physiological and psychological measurements, has become *social anthropology* (Niceforo).

¹ Since I have been in Ménilmontant (a poor quarter of Paris) I no longer know what a normal child is, declares a district nurse (Cantegabe).

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Referring to the data of the authors who had preceded him, and completing them by his own researches, this Italian scientist demonstrated a distinct inferiority in the poorer classes as regards height, absolute and relative weight, chest measurement and expansion, respiratory capacity, muscular power, resistance to fatigue, dimensions of the skull, cranial capacity, weight of the brain and acuteness of the senses. In the lower social groups, the age of puberty is retarded (sometimes by two years), the hair becomes grey earlier, and malformations are more numerous.

Later researches, undertaken in different countries, have confirmed these findings. For example, in height, weight and muscular power it has been found that English student girls, on the average, are superior to working-class girls, even those whose work requires considerable strength.

If 100 labourers and 100 professional men are ranged in order of height, and if each of these two series is divided into 5 groups of 20, the average height of each group of the working class will be inferior to that of the corresponding group of the professional class: the whole series becomes retrograded.

In his comparisons, Niceforo divides the population sometimes into two classes—middle class and labouring class—sometimes into three classes; (a) professional men, (b) small tradesmen and clerical employees, (c) labourers; the height and weight decrease from one class to another. Stephenson observed that at 30 years of age non-workers of the male sex surpassed the workers by $2\frac{1}{2}$ inches in height and by 14 pounds in weight. Pfitzner found that the average height of the well-to-do class was $1\frac{3}{8}$ inch greater than that of the middle and poorer classes. The anthropometric Committee of the British Association, dividing the population into five classes, found a difference of $3\frac{1}{2}$ inches between the average height of the first class and that of the lowest class. Roberts, dividing the population of Edinburgh into nine social classes, found that the average height was 55 inches in the more favoured class, and decreased from class to class by 1 or $\frac{1}{2}$ inch to 50 inches in the poorest class.

Does this biological inferiority of the labouring class exist at birth or does it manifest itself later? In other words, does the average weight of 100 new-born infants of the labouring

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class differ from that of 100 new-born infants of the middle class ?

Occupational or domestic work, if exacting and continued during the last months of pregnancy, may precipitate labour : the child being born one or two weeks before term, is found below normal in length and weight. Pinard noticed that at the beginning of the war, when the majority of women working in the factories and workshops of Paris were discharged, the children they produced were healthy ; but, as soon as female labour was required for the munition factories, the length and weight of the infants became reduced, owing to shortening of the period of gestation.

Apart from premature births, some writers do not recognise any difference between the social classes as regards length and weight of the new-born (Kerr-Love, Campbell, Murray), while others, in central and western Europe and in India, report an inferiority in the poorer classes (Goldfeld, Simon, Nicolaieff, Peller, Nandi).

It is instructive to examine the effects produced on the new-born by the blockade of Germany and Austria, as well as by the scarcity of food in central and eastern Europe in the years following the war. When the restrictions did not exceed certain limits, as in Germany, where, however, the food ration had been reduced by about a half, the length and weight of the new-born were not affected. According to Zangemeister and Siegel, the average duration of pregnancy increased, thus compensating for the retarded growth of the fœtus.

But in Vienna and in Odessa especially, where real famine raged for several years, Peller and Gerschenson found that the length and weight of the new-born decreased (the weight by half a pound on the average), without the occurrence of premature labour. Bondi has remarked that illegitimacy sometimes has the same result on the new-born.

From these facts, it appears that, apart from industrial labour, the unfavourable social conditions which may affect pregnant women do not in general impair the development of the child ; the mother bears all the burden of these privations. But, if poverty becomes acute, the limits of maternal sacrifice are passed,

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and the child suffers in turn. Thus, social inequalities, in a country endowed with efficient maternal protection, such as England, causes no difference in the size and weight of the newborn, while we find this divergence in nations which have not adopted sufficient protective measures. The countries most advanced from the economic and social standpoint have succeeded in combating poverty and attenuating its effects to the extent that at birth there is no appreciable difference in the average size and weight of infants belonging to the different social groups. On the other hand, after birth, the growth of the child is influenced by its social environment, the action of which is seen in all countries.

Pooler, in studying the average weight of infants among the working classes in Birmingham, divided the families into three groups according to their wages calculated per head. He found no characteristic difference till the age of 3 weeks, but the distinction between the groups was quite evident at 13 weeks and persisted throughout the first year. Macgregor at Glasgow, found this divergence from the age of 2 till the age of 10 years. At Stuttgart it has been noted up to the age of 19 years.

The school age is the easiest field for this study, which has often been undertaken on a considerable scale : at Leipzig it was based on 604,000 examinations. In all countries—England, Scotland, France, Belgium, Germany, Austria, Switzerland, Italy, Denmark, Norway, Sweden, Russia, the United States—these observations are mutually confirmatory ; whether the children attending private schools are compared with those attending free schools ; whether they are grouped according to the occupation and income of the father ; whether they are subdivided according to the quarter in which they live, or according to the number of rooms which the family occupies, the average height and weight of scholars belonging to well-to-do families is higher than those of scholars belonging to the labouring classes. The average differences may reach 4 inches and 13 pounds. In the United States, Canada and Australia the divergence is less than in Europe, owing to the better conditions of the working classes in these countries.¹

¹ The most recent contributions to this subject are those of Paton and Findlay and of Franzen. In children of the well-to-do class the

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In short, when poverty is of moderate degree, social conditions do not create appreciable differences between infants till after the first month of life. But from the end of the third month, in infants of the working class, a retardation of growth is noticed which is accentuated for some time, then diminishes or remains stationary. During the school age the annual index of growth does not vary with the social position. With adolescence, growth is completed slowly and often imperfectly in the working class, especially if the child has been submitted too early to the influences of industrial work. This explains why, on the whole, the height of adults reflects their social condition.

Researches carried out for a century confirm, and at the same time give precision to, the conclusions arrived at by Villermé in 1829 :

Men increase in stature and their growth is more rapid according as, other things being equal, their country is rich, comfort is more general, dwellings, clothes and especially food are of better quality, and as the troubles, fatigues and privations of infancy and adolescence are reduced : in other words poverty, or rather the circumstances which accompany it, produce people of small stature and retard the age of complete development of the body.

And is it the same with intellectual development ? Daily observation and certain definite data lead us to this conclusion, which a new method has supported by circumstantial evidence. Psychology formerly concerned itself with elements common to all men. In studying individual differences modern psychology has opened up a new field. One of its most remarkable results is the measurement of intelligence.¹

Cattell, a pupil of Wundt, took in the United States (1890) the first step in this direction, but it was Binet, in France (1905), who conceived the idea of arranging a series of tests to determine the standard attained by the child in the course of his intellectual

height increases more rapidly than the weight. The index obtained by dividing the weight by the height is therefore higher in children of the less favoured classes. Consequently, it cannot be utilised to signify the state of nutrition.

¹ A critical analysis of numerous papers on this subject has recently been published by Gladys C. Schwesinger

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development ; not his knowledge, which is the business of school examinations, but his faculties.

Originally intended for the classification of backward children, *mental tests* are now universally employed in psychology, in pedagogy as well as in occupational guidance and selection.

The principle of these tests is simple. By experiment one ascertains what are the problems which a normal child is capable of solving at a given age ; for example, let a young child find what is wanting in the picture of a cat which has been drawn without a tail : let older children choose among several words the names of animals, or those of contrary meanings ; correct the order of a jumbled sentence ; trace the way out on a plan of a maze ; open a box having a complicated fastening. For this synthetic method there is a tendency to substitute the analytical method which distinguishes between the faculties of acquisition (attention, memory, association, imagination) and those of elaboration or execution (judgment, reasoning, discrimination, generalisation). Tests have been applied to these different faculties as well as to vocabulary, general knowledge and occupational experience ; tests for personality and character are being studied. This analysis gives a psychological profile of the individual (Rossolimo).

Collective tests may be carried out simultaneously by a number of persons ; others require individual examination. Some tests, which do not apply to reading, writing or speech, are devised for the illiterate and for foreigners. By these tests the mental age of the subject is determined : if at 15 years he can only respond to tests established for children of 12 years, his mental age is 12 years, although his chronological age is 15. The intellectual quotient is determined in the same way ; 100 being the normal, the supernormal rise sometimes to 150, the subnormal may fall to 0. In the above example the intellectual quotient is $\frac{12}{15}$ of $100 = 80$.

This method is on the whole remarkably exact ; collectively the quotient of good scholars exceeds that of the mediocre ; children who reach a high quotient prove themselves capable of pursuing higher studies.

Again, occupational tests permit of rapid and certain evaluation

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of individual aptitudes. At the Carnegie Institute at Pittsburg, the efficiency of fifty telephone girls was determined in half an hour, and the classification was confirmed after three months' service.

We must not expect from general tests more than they can give, only special tests will reveal the gifts needed by artists, musicians, writers, or inventors. The intellectual quotient is only a wholesale estimate of intelligence, of general knowledge, of the practice of intellectual operations, and lastly of familiarity with the ideas upon which the tests are based. It expresses the possibilities of the individual; but it is the use that he will make of them which will determine the success of his career.

Applied to a group homogeneous in language, education and environment, well-chosen tests measure fairly accurately the innate mental faculties. It is quite otherwise when a person who is well acquainted with a language is compared with one who only has a superficial knowledge of it, or when a man who is accustomed to write, to solve problems, or to engage in abstract arguments is compared with one whose intellectual environment is poor and whose mental experience is restricted. The more we advance in the series of mental ages, the more do the tests appeal to acquired knowledge; the faculty of analysis is inseparable from education and mental exercise.

Care is therefore necessary in making a comparison, with regard to the intellectual quotient, between townsmen and countrymen, between the upper and lower classes, and between natives and foreigners. This influence of environment and of education is shown by the fact that in the United States the intellectual quotient of the negroes rises in proportion as we pass from the southern to the northern states.

In all countries it has been established that the intellectual quotient of each child varies little from its early years to adult age. With the exception of cerebral affections and deafness, the quotient is hardly affected by disease, accident or disorders of growth. However, experience of life, environment, and social conditions may modify it to an appreciable extent.

On the average, but not in each particular case, the most

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intelligent children are superior in weight, height and health.¹ The mentally retarded are on the whole, but not without exception, also physically retarded; this inferiority is general and organic.

From the view-point of social psychology, the most interesting application which has been made of the measurement of intelligence is the examination of the American army raised by conscription. With the method of group tests, this investigation was carried out from September 1917 to January 1919 on 42,000 officers and 1,727,000 men (of whom 14 per cent. were negroes); an immense undertaking inspired and directed by Robert M. Yerkes, an eminent psychologist and statistician.

It was first of all found that 25·3 per cent. of the recruits were incapable of reading the newspapers, or at least of understanding them, and unable to write to their families. These, and others little familiar with the English language, were subjected to special tests.

The results of the whole examination were classified as follows :

Intelligence very high : mental age 18 years or more	4 04 per cent.
" high : mental age 16·5 to 17·9 years .	7 90 "
" above the average : mental age 15 to 16·4 years	14 93 "
" average : mental age 13 to 14·9 years .	25 39 "
" mediocre : mental age 11 to 12·9 years .	25·40 "
" low : mental age 9·5 to 10·9 years .	20·66 "
" very low : mental age below 9·5 years.	1 68 "

On referring the mental age to the occupation it was found that the groups characterised by high or very high intelligence were formed chiefly by men belonging to the liberal professions; the group in which intelligence was above the average included clerical employees, technical experts, and foremen; the group of average intelligence consisted chiefly of skilled labourers; the groups of lower intelligence consisted almost entirely of unskilled labourers.

There were, however, some exceptions. The professional men included some whose intelligence was hardly above the average

¹ Unless the school system drives them, through intellectual overwork, to neglect physical culture and hygiene, as it seems to do in France.

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and, conversely, certain labourers had a high intellectual quotient. As a general rule, however, the occupational classification corresponded with the intellectual.

But occupation is one of the fundamental elements which divide the population into social classes. We should therefore expect to find a certain agreement between the intellectual classes and the social classes.

When juxtaposed (for the United States) these compare as follows :

Intelligence, high .	27 per cent	Independent and	
Intelligence, average	25 "	middle class . .	33 per cent.
Intelligence, medi-		Skilled workers .	26 per cent
ocre or inferior .	46 "	Semi-skilled and un-	
Marked mental de-		skilled workers .	41 "
ficiency . . .	2 "	(Among which the	
		very poor repre-	
		sent	3 ")

The parallelism of these two tables is striking, but we have already pointed out that we must be prudent when comparing mental faculties of groups belonging to different social circles.

Evelyn M. Lawrence has reported, in England, that intelligence is more widespread among the well-to-do classes, but that if the conditions of environment are favourable the difference is hardly appreciable. There are many people of low intelligence belonging to the independent class, and of high intelligence among the wage-earners.

In no other country has a measurement of the intellectual quotient of adults been undertaken. There are, however, many data concerning young people. Among 13,000 school children of Northumberland, Duff and Thomson found that the average intelligence decreased with the social level of their parents. The average quotient was :

112	when the father practised a liberal profession
110	" " " occupied an important commercial position
105	" " " was a retail shopkeeper
103	" " " foreman
101	" " " skilled workman
98	" " " miner
96	" " " semi-skilled or unskilled labourer

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Reducing these categories to two classes, we obtain an average of 106.6 for children whose fathers belonged to a non-manual profession, and 96.6 for children whose fathers were manual workers.

Extensive researches dealing with London school children have confirmed the correlation which exists between social status and intellectual quotient. This correlation, both in boys and girls, varies from 0.3 to 0.4; i.e. in the total of factors which cause variation in the intellectual quotient, the social status counts for one-third (Isserlis and Wood). The same conclusion was reached by Holzinger in the United States. According to certain American investigations, the average intellectual quotient of children of the richer classes exceeds that of children of the working classes by a quarter to a third. The study of 20,000 children in Germany has shown that the average of school marks rises with the occupational status of the father from the daily labourer up to the members of the learned professions (Hartnacke and Kramer). These differences extend to the functional capacity of the sense organs.

According to observations made at Vienna (Hetzer and Wolf), this difference does not occur till the age of 5 months. American psychologists found it after the age of 4 years, Alice Descoeudres in children of 2 and 3 years, and Gesell and Lord between 30 and 52 months. Decroly estimated it by the Ballard test in Belgian children aged 8 to 15 years. The difference, of 13 per cent. at 8 years reaches 8 per cent. at 10 years; it rises rapidly to 13 per cent. in children of 11 years, and then gradually decreases till 15 years, when it does not exceed 3 per cent.

However, in analysing separately the results of each category of tests, Alice Descoeudres found that in children aged from 2 to 7 years, there was no social difference for the tests of attention and judgment. But the tests for vocabulary and for general knowledge showed deviations (up to 2 years mental age) between children of the well-to-do and of the labouring classes. At Chicago, between two groups of children aged from 2 to 4 years, attending infant schools, one of which was situated in a poorer quarter, the other in a wealthy suburb, no difference existed as regards the tests for action and judgment; indeed, the poorer

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children were in many cases made competent ; on the other hand, the richer children were more successful in the tests for vocabulary (Kawin). Gesell and Lord also observed that children of the poorer classes were superior in certain tests. Cyril Burt noted that while the children of private schools in London led in the tests for language, instruction, memory and general knowledge, the children of the free schools were superior in tests which brought into play the acuity of the senses, a sense of the value of money, a critical sense in the usual circumstances of life—in fact, the practical qualities needed in daily existence. Kiri-hara found the Japanese school children belonging to the working class inferior to others as regards tests relating to abstract intellectual operations, but not for concrete tests

Unfavourable social factors therefore exercise the same influence on mental as they do on physical growth : they cause a retardation which may begin in the first year of life. Does the mental growth complete itself later in children of the working classes, or is it arrested prematurely ?

Spielman and Burt have compared the average intellectual quotient and the distribution of children in different types of schools, with the distribution of adults in the different occupational groups :

Intellectual Quotient.	Educational Establishments Attended	Percentage of Children	Occupation of Adult	Percentage of Adults
Above 115 (super-normal)	Above primary school . . .	12	Non-manual occupations . . .	15
85-115 (normal).	Primary school .	76	Semi-manual and lower commercial occupations . .	59
Below 85 (sub-normal)	Classes for backward and abnormal children .	12	Purely manual occupations . .	26

If we suppose that every supernormal child engages in a non-manual occupation, among the 76 per cent. normal, 78 per cent. will enter the semi-manual and lower commercial occupations,

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4 per cent. will rise to the intellectual professions, and 18 per cent. will descend to purely manual occupations. The correspondence between intellectual qualities and occupation is therefore imperfect; for nearly one-fifth of normal adults (one-seventh of the active population) the occupation followed is at a lower level than that which would have been anticipated from the intellectual capacity during the school period.

Is this loss of position due to the number of posts open to normal persons being less than the number of those who are qualified to occupy them, or does the influence of environment produce an actual intellectual deterioration? In other words, does the fault lie in the occupational distribution or in the influence of unfavourable surroundings?

It has been established, in the rural schools of America, that the average intellectual quotient of children decreases by 10 per cent. between the ages of 10 and 14 years. In all countries, teachers, whose pupils belong to the working class, observe, after a few years, in many children a slackness in inclination for work and in concentration; later on, for want of a suitable environment, the adolescent and the adult rapidly lose the knowledge which they had previously acquired. At the age for military service, some youths who had passed through the primary schools could no longer read nor write. The fatigue of a purely manual occupation, the uncultured surroundings and the monotony of existence blunt the faculties which in more favourable circumstances might have continued to develop.

Thus it is the same with the mental as with the physical development. At the beginning of life the gifts are equally distributed among the different social groups; but soon, in some of these, a retardation is manifested which creates permanent distinctions between the classes. This intellectual backwardness may be explained theoretically either by heredity, by the influence of environment or by a repercussion of the physical on the mental condition. We shall see which is the right explanation later.

It is not therefore a matter for surprise that Pieraccini, in Italy among children of the well-to-do class, found 31 per cent. highly intelligent, 54 per cent. of medium intelligence and 15 per cent. of low intelligence, against 21 per cent. of high intelligence, 52

per cent. of medium intelligence and 27 per cent. of low intelligence in children of the working classes; that, according to an inquiry conducted in California, 53 per cent. of highly intelligent children were found in the upper classes, 37 per cent. in the middle class, and 6 per cent. in the working class¹ nor that, at Bremen, 12 per cent. of the children from private schools and 3 per cent. of those attending free schools qualified to enter a university. The supernormal children as a rule belong to families in comfortable circumstances and are living in contact with or within intellectual circles above the normal.

These conditions being more often realised in towns than in the country, it is chiefly in towns that supernormal children are found.² The same reasons explain why, *as a general rule*, each social class is recruited from its own stock³

Nothing of what we have said concerning a whole class can apply to an individual or a family. Every degree of health and intelligence is observed in each class of society. But in comparing them with each other, i.e. in making observations on a large number of cases, we find, *on the average*, differences the origin of which we will have to define.

¹ In Japan, an intellectual quotient above normal is found in 10 per cent. of working-class children, and in 85 per cent. of children of the upper class (Kishihara)

² The tests have shown that the inequality in intelligence between the town and the country is less than that which the results of school examinations would lead us to admit. In competitive examinations for scholarships, how can a village child taught in an over-crowded school compete with town children, who see and hear so many things, who have public libraries at their disposal, and who attend schools which are well equipped? Since, in Northumberland, the scholarships have been awarded after a school examination and also an examination by the method of tests, the proportion of those won by country children has notably increased.

³ Of 4,421 celebrated men studied by Maas, 635 only were the sons of working men or peasants, and these were mainly artisans, i.e. belonging to the social stratum nearest to the middle class. The development of the mind requires leisure, economic security and the stimulation of intellectual surroundings.

CHAPTER VI

INEQUALITY OF THE SOCIAL CLASSES IN RESPECT TO SICKNESS AND DEATH

WE have studied the social classes from the standpoint of anatomy, physiology and psychology. It remains to consider them from the point of view of pathology. In what measure do social influences affect the frequency and course of diseases and the duration of life?

The *inequality of the social classes as regards death* is considerable. Hippocrates had already noted that in the epidemic of Perinth the free women suffered less than the slaves. At Duisbourg, in 1871, the cases of smallpox were five times, and the deaths from it were seven times, more frequent among the poor than among the rich (per 1,000 persons of each category). The same fact was noticed during the epidemic of cholera in Hamburg in 1892, the mortality per thousand of each class being nineteen times greater among those earning less than 1,000 marks than among those whose income exceeded 50,000 marks, although the water supply was the same for both. In the United States the influenza epidemic of 1918 caused unequal effects in the different classes of society; taking into account the differences in age, for 100 deaths in the well-to-do class, there were 108 among persons of moderate means, 137 among the poor and 263 among the destitute (Bruno).

In his work on the anthropology of the poor, Niceforo collected most of the observations of this kind anterior to 1910. Treatises on sociological pathology, hygiene and demography bulk large in this material. Hersch, Selwyn D. Collins, Edgar Sydenstricker, Britten, and Howard Whipple Green have recently dealt with this subject.

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The problem has been approached by comparing the morbidity, mortality and fitness in the different occupations, in different districts, in different economic groups, and lastly in different social classes.

We will commence with the study of *social mortality*. Among the oldest investigations we may mention those of Benoiston de Châteauneuf and Casper, soon followed by those of J. B. Hoffmann in Berlin, von Lichtenstedt in St. Petersburg, Chadwick in England and Ducpétiaux in Belgium. Casper compared 1,000 princes and nobles with 1,000 beggars; at all ages the difference was in favour of the former among whom the average duration of life was 50 years, that of the second category not exceeding 32 years. Janssens, at Brussels, found 14.4 deaths per 1,000 among the non-indigent, and 23 per 1,000 in the indigent. But these are extreme cases.

In a large number of towns the elder Bertillon, and other statisticians after him, made a comparison between the mortalities in the poor and rich *quarters*. Two recent examples will suffice. In Brussels, in 1930, the mortality of the sixth division was 8.6, that of the third division 14.3. For Glasgow, in 1931, the mortality was 9.9 in Cathcart, 19.3 in Calton.

It may be objected that in the districts compared the composition of the population was not identical in age. The death-rate is comparatively high in early life, and in old age; if one of the two districts has a larger proportion of children or old people, its death-rate will be thereby artificially increased. It is easy to avoid this cause of error when the mortality at each age is known. Reducing the two populations to a standard type, we calculate the *standardised death-rate*.

Applied to London, this method confirms the data furnished by the crude rate. At Lewisham, a borough inhabited by the well-to-do, the standardised mortality was 10.4 per 1,000 for the period 1909-13. At Shoreditch, a poor borough, it rose to 19.2 per 1,000.

These figures give a useful indication, but they do not express the true mortality of the poor and the rich, for each borough contains a mixture of different social classes. A more precise estimate is obtained by noting the mortality in different wards of

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the same borough, each ward having a more homogeneous population than the borough taken as a whole. Thus, in 1906, in Finsbury, a borough of London, one ward had a mortality of 8 per 1,000, while in another it was 36.

The results are still more definite if a census is taken of mortality according to the different types of *dwellings*. In Finsbury (1906) this procedure showed a mortality of 6.4 per 1,000 in families occupying at least four rooms, a mortality of 39 in families living in a single room.

Similar results have been obtained in many other towns, especially in Berlin, Vienna, Budapest, Lausanne, Trieste, Rome, York, Edinburgh, Glasgow, Dundee, New York and Cleveland. In the poorest quarters and lodgings, the mortality is sometimes sixfold that of the quarters and houses of the well-to-do. This inequality, which is common to the two sexes, is found at all ages. It is not therefore, in the first place at any rate, of an occupational order, but rather of social origin.

The same conclusions are reached in comparing the different *economic groups* of the population. In analysing the death certificates of the town of Providence (Rhode Island) for the year 1865. Chapin found that the mortality was 10.8 per 1,000 among the tax-payers and 24.8 among those exempt from income tax. The difference was as one to two under the age of 5 years; it was nil between 5 and 9 years; after 10 years it resumed its former amplitude which increased more or less regularly till old age; at the age of 70 and over, the difference was as one to four. Reck in Brunswick, Wolff in Erfurt, Sachs in Halberstadt, Conrad in Halle on Saale, have obtained similar figures between 1850 and 1880. Karup, Gollmer and Florschütz have confirmed these data, on the basis of the statistics of insurance companies. Rollo H. Britten came to the same conclusion in the United States. Alter found recently that the death-rate among hospital patients in Germany was 3.59 per cent. in the first class, 3.83 in the second class, 6.02 in the third class, for which the daily maintenance rate is lowest. Among patients hospitalised in private rooms the death-rate was 3.78, among ward patients 19.88 per cent.

Comparisons have been made from this point of view between the *social classes* themselves. At Dublin, in 1911, the mortality

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(after standardisation of the population) was 12.0 for the liberal professions and persons of independent means, 14.3 for business men and employees, 21.3 for workmen (exclusive of the assisted). The difference is as one to four below the age of 5 years, and it diminishes up to the age of 65 years.

At Bremen about twenty-five years ago, the death-rate was lower in the well-to-do class than in the middle class, and again lower in this group than in the working class, at all ages up to 60 years and for all causes of death, apart from diseases of the digestive system (in adults) and cancer. There were a few exceptions, no doubt accidental, as regards the middle class.

Sorensen, in Denmark, analysing 43,000 deaths between 1865 and 1874, divided the population into three groups: persons in an independent situation, small traders and employees, workmen and servants, each of these groups being standardised as to age. The mortality in the three groups was respectively 16.5, 20.2 and 31.2 for men; 13.4, 12.3 and 22.3 for women. There was no great variation with age.

At Budapest, Korosi, fifty years ago, estimated as follows the average survival rate after the age of 5 years:

Well-to-do class	52 years
Middle class	46 years 1 month
Workmen and peasants	41 years 7 months

Twelve American insurance companies estimated that, from 1915 to 1926, for 100 deaths among the insured practising a liberal or intellectual profession, there were 112 among skilled workers, 136 among the semi-skilled, and 145 among unskilled labourers. In 1911 the workmen and employees insured by the Metropolitan Life Insurance company had at birth an average expectation of life $6\frac{1}{2}$ years below that of the general population ($46\frac{1}{2}$ against 53 years). In 1933 the difference was reduced to 2 years (59 against 61).

By means of Dutch statistics, Prinzing had already distinguished between the mortality among wage-earners and that among persons of independent means. But we now possess figures of a still greater range, embracing the whole male population of England, divided into five social classes. This vast compendium of social demography compiled by the Registrar-General of

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England applies to all men of 20 to 65 years, and extends over three years 1921, 1922, 1923.¹ The composition of the five social classes was standardised as to age. Taking 100 to represent the average mortality for the whole of the male population, the figures for the different classes were as follows : 81.2 in the independent class ; 94.2 in the middle class ; 95.1 among skilled workmen ; 100.7 among semi-skilled, and 125.8 among unskilled labourers.

In what measure does this inequality in mortality of the different social classes exist at all ages of life ?

It is hardly possible to ascertain this for the *prenatal period* ; abortions are seldom notified, and even if we knew their total number it would be necessary to deduct induced abortions, concerning which data are naturally wanting. On the other hand, occupational influences are very clear ; the number of abortions is considerably higher in working women than among those of the same class who do not go out to work. It is also higher among unmarried women than among the married.

We are better informed in regard to *mortality* at birth ; still-births are due partly to prenatal influences, and partly to the complications of labour. In countries which have developed economically and socially, mortality at birth varies little according to occupation, district, housing, income and class. Exceptions to this rule are found in cases of extreme poverty, as well as in countries with a mixed population, differing in race, religion, customs and standard of life. Thus at Tunis, in 1921, the mortality at birth was 4.6 per cent. of births for the French, 4.7 for the Jews, and 9 per cent. for the Moslems ; the labouring class and unmarried mothers contributing the largest proportion.

In towns the mortality at birth is higher than in country districts, sometimes to a considerable degree (4.4 against 1.6 in Roumania in 1925).

¹ A similar report was issued for the years 1911, 1912, 1913. In 1930, in six States in the United States, the mortality among men of 15 to 64 years forming part of the active population being represented by 100, it was 92 for the independent and middle classes, 103 for skilled workers, 113 for semi-skilled workers, and 129 for unskilled labourers. It would appear that social inequality in regard to mortality is greater in the United States than in England (Britten).

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Infant mortality, or the mortality during the first year, excluding stillbirths, is subject to the action of social factors even more than the general mortality. In Brussels (1930) the infant mortality reached 32·3 in the sixth division, and 113·4 in the third division, per 1,000 live births. In different quarters in Glasgow it varied from 50 to 131. Similar figures have been recorded for many other towns.

In Holland, Denmark, Germany and England analogous variations have been noted according to occupation, district, housing, income and social position.

In investigations carried out by the United States Children's Bureau, and dealing with seven widely different communities, the families studied were classified according to the annual income of the father; from the group in which this was highest to that in which it was lowest, the infant mortality became trebled. This divergence was found both in breast-fed and bottle-fed infants, in the children of parents of American birth as well as in those of immigrants, and in both the white and black races (Woodbury).

Let us compare two London boroughs in 1913: Hampstead, a middle-class suburb, and Shoreditch, a poor quarter. In infants less than a week old the mortality is the same: 21·1 in the former, 21·6 in the latter. In the second week the difference commences, 4·5 against 6·5; in the third week, 3·0 against 6·8; in the fourth week, 1·5 against 2·3; in the first quarter 30·1 against 37·2, in the second quarter 13·6 against 29·9, in the third quarter 6·8 against 28·2, in the fourth quarter 3·8 against 23·9, or a mortality six times higher in the poor district than in the rich.

The Report of the Registrar-General for England gives statistics for the whole population of England, divided into five social classes. Taking 100 to represent the general mortality, the infant mortality in 1921-3 was as follows:

Independent class	.	.	.	.	.	.	48
Middle class	.	.	.	.	.	.	70
Skilled workmen	.	.	.	.	.	.	97
Semi-skilled workmen	.	.	.	.	.	.	113
Unskilled labourers	123

For the first month the infant mortality of the independent

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class is, on the average 69, that of unskilled labourers 109; for the second and third months together the corresponding figures are 33 and 127; for the second quarter they are 33 and 134; for the third and fourth quarters combined they are 32 and 137. In the first year of life, excluding the first month, the mortality among the children of unskilled labourers is four times that of the children of the independent class.

Illegitimacy and the employment of women in industry also contribute to raise the infant mortality. But maternity welfare measures have abolished this factor, as regards illegitimacy, in Iceland, and to a considerable extent reduced it in Holland and Scandinavia. In England in 1921 the mortality among illegitimate infants was exactly double that of the legitimate; one reason for this being that syphilis as a cause of death was eight times more frequent among the illegitimate.

In many countries the infant mortality, which was formerly higher among urban than rural populations, tends to become lower in the towns than in the country. As to the influence of race, it is difficult to separate this from the economic, educational and social conditions.

After the first year the difference in infant mortality between the independent class and that of unskilled labour diminishes till the age of 20 years, then increases till 35 years, afterwards diminishing again till 65, when it is not more than 16 per cent. After this age it is difficult to estimate the comparative mortality, as the statistics are vitiated by various factors. At all events, the proportion of individuals who pass this age is much less in the working classes than in the middle and independent classes.

Since the eighteenth century in France, and elsewhere from a more recent period, the *birth-rate* has become reduced in the population in general, but especially in the middle and independent classes, at any rate in industrialised countries.¹ A comparison of the different quarters of the same town is significant in this respect. In England, taking 100 to represent the average birth-rate for the whole population in 1921-3, we have:

¹ The same trend was observed in ancient Greece and Rome.

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Independent class	70
Middle class	74
Skilled workmen	100
Semi-skilled workmen	116
Unskilled labourers	127

Sydenstricker found a birth-rate coefficient of 89 for 1,000 rich or well-to-do American women, 174 for 1,000 women belonging to other classes. This divergence in fertility does not commence till 20 years, and increases with age. In families which do not practice contraception, there is no difference in the birth-rate between the various social classes (Pearl). The variations in the birth-rate of different social classes are great in Holland also, but they have considerably diminished in Germany, France, Italy and Sweden. At Stockholm the birth-rate in the working class is 25 per cent. lower than in the well-to-do class; on the other hand, the infant mortality is 28 per cent. higher in the working class. The birth-rate in families with a taxable income of 10,000 crowns (about £500, \$2,500) exceeds by 50 per cent. that of families whose income is under 4,000 crowns (£200, \$1,000); the birth-rate in the latter is still higher than that of the labouring class; the families being standardised as to age. In Germany the proportion of families respectively with 0, 1, 2, 3, 4, 5 or more children was in 1933 identical in the independent class and the industrial workers.

The facts we have just given relate to the total mortality. The analysis is carried further by considering separately the different causes of death.

Among the causes of *mortality* at birth, Dame Janet Campbell has found that syphilis, premature birth and ante-partum hæmorrhages are progressively more frequent as we descend the social scale; the contrary is the case for congenital malformations, abnormal presentations and accidents of parturition.

As regards *infant mortality*, investigations pursued by the United States Children's Bureau have shown that if we compare infants less than one year old whose fathers earn at least 1,250 dollars, with infants whose fathers earn less than 450, the mortality from gastro-enteritis is seven times greater in the second group than in the first; the mortality due to respiratory

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affections and to infectious diseases is five times greater (Woodbury).

For the whole of England, the infant mortality increases from the independent class to that of the unskilled labourers for all causes of death except two: congenital malformations, which are equally distributed among all classes, and injuries during birth, which are less frequent as we descend the income scale. Among the masses, the doctor is called to attend labour only in difficult cases; among the well-to-do, he remains in constant attendance and is tempted to hasten delivery, even in cases where it is not absolutely necessary to do so.

The infant mortality due to infectious diseases being represented by 100 for the whole population in England, it is 22 in the independent class and 133 in the labouring class. The difference is almost the same for gastro-enteritis, 32 and 141. It is less marked for dystrophies and abnormalities of development, 63 and 114, which is in accord with the fact that congenital anomalies affect the different social classes more equally.

For *older children and adults*, it has long been known that infectious diseases (especially tuberculosis), as well as respiratory diseases (bronchitis, pneumonia) are widespread among the lower classes. In Paris in 1909-13, the difference between the district in which the mortality from pulmonary tuberculosis was lowest and that in which it was highest was 1 to 7 (83 per 100,000 persons in the eighth division, 554 in the twentieth division); in 1927 the difference was reduced by half (77 in the eighth division, 287 in the fourteenth division). In Brussels in 1930 the mortality from pulmonary tuberculosis was 3.23 in the sixth division, 17.4 in the third division. Gebhart, in 1899, reported that among 10,000 citizens of Hamburg having an income over 10,000 marks, 10.7 died from tuberculosis, while among 10,000 citizens having an income of less than 900 marks, 60 died from this disease.¹

Recently, in Cleveland, the tuberculosis death-rate, calculated

¹ In 1912 these figures were reduced to 4 for incomes of 5,000 to 10,000 marks, against 24 for incomes below 1,200 marks. Gottstein obtained similar figures for Charlottenburg, and Peller for Vienna. Since that time the difference between rich and poor districts has been reduced in several countries.

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on a standardised population, was 35 per 100,000 inhabitants in the richer quarters, 710 in the poorer quarters, or a difference of 1 to 20 (Howard Whipple Green).

Florschütz, on examination of persons insured in different life-insurance companies, found twenty years ago : 65·6 deaths from pulmonary tuberculosis, when the assured capital exceeded 6,000 marks ; 95·2 when it was between 3,000 and 6,000 marks ; 131·8 when it did not exceed 3,000 marks.

The same contrast is shown when we compare, not the income, but the social position : for example, the mortality from tuberculosis in Saxony at the beginning of the century (Radestock) :

	Men.		Women	
	Independent	Salaried	Independent	Salaried
Agriculture .	10 40 ¹	7 80	3 56	5 48
Industry .	15 42	17 66	5 53	20 95
Commerce . .	5 53	24 71	5 32	13 34

The report of the Registrar-General gives the distribution of all causes of death among the whole male population of England between 20 and 65 years.

In a first group—*diseases of the poor*—the incidence for the whole population being represented by 100, we find the following figures :

Bronchitis : 24 in the independent class, 176 among unskilled workmen ;

Tuberculosis of the respiratory tract : 49 and 140 ;

Tuberculosis in general : 51 and 137 ;

Cancer of exposed sites : 58 and 140 ;

Hernia : 56 and 132 ;

Valvular disease of the heart : 57 and 128 ;

Pneumonia : 83 and 150 ;

Syphilis and its sequelæ (tabes, general paralysis and aortic aneurism) : 73 and 140 ;

¹ The reason why this figure exceeds that of the salaried, is that among the " independent " agriculturists are many poor peasants owning very small farms.

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Influenza : 83 and 118 ;

Accidents : 81 and 120 ;

Chronic rheumatism : 63 and 117.

For all these affections the mortality increases progressively from the independent to the middle class, from this to the skilled workmen, from these to the semi-skilled, then to unskilled labourers.

On the whole, causes of death which affect the poor more than the rich include infectious diseases (with tuberculosis and syphilis), affections of the respiratory tract, valvular disease of the heart, cancer of exposed regions, chronic rheumatism and accidents.

In a second group—*diseases of the rich*—the mortality rate diminishes as we descend the social scale, but this decrease is only regular for appendicitis (170 in the independent class against 70 among unskilled labourers), and for affections of the prostate (138 and 81), the groups being standardised according to age. The decrease is irregular for cirrhosis of the liver, diabetes, arteriosclerosis and suicide. It is necessary to add gout, which is classified with chronic rheumatism.

Lastly, the third group comprises *diseases which affect the different social classes more or less equally* : deep-seated cancer, intestinal obstruction, and what have been called in a general way affections of wear and tear : senility, non-valvular affections of the heart, arterial disease, chronic nephritis, cerebral hæmorrhage and softening of the brain.

Are affections which lead to a high death-rate in the poorer classes more frequent or more severe among them than among others ? Social conditions may give rise to a disease, favour its development or affect its evolution. They therefore influence not only morbidity and mortality, but also *lethality*, i.e. the frequency of a fatal issue among the persons affected.

This has been demonstrated by Zadek, who, at the dispensary in Neukölln, a suburb of Berlin, found that among the tuberculous whose income exceeded 5 marks per head and per diem (after allowing for rent and taxes), one only died in the period examined ; on the other hand, 48·5 per cent. of the deaths occurred among patients receiving only one or two marks, although this category only included 34·8 per cent. of the patients.

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Again, the lethality of infectious diseases in children is much higher in the working classes than among the well-to-do. In Vienna, from 1891 to 1900, a comparison of 100 cases of diphtheria observed in the first division with 100 observed in the fifth division shows that the ratio of the number of deaths was as 1 to 2; for scarlatina it was 1 to 3, for whooping-cough 1 to 4, and for measles 1 to 20.¹

For tuberculosis the difference is less marked in the young. Among Viennese school children of 6 years, all submitted to a tuberculin test since 1925, the proportion of positive reactions was 24 per cent. in the prosperous quarters, 36 per cent. in working-class districts (Gottlieb). This comparatively small difference indicates that we cannot attribute the considerable preponderance of mortality from tuberculosis in adults of the working class to unequal risks of contagion. Nearly the whole of the urban population is infected towards the age of 20 years—the poor a little earlier than the rich; but the conditions of existence render the former less resistant than the latter to the disease.

On the whole, the general mortality, but especially infant mortality, and that from tuberculosis and infectious diseases furnish the best index of social inequalities. The reduction of the general death-rate in a country indicates improvement in hygiene and better conditions of existence for the population taken as a whole: it is the *index of national progress*. On the other hand, the difference between the mortality of the independent class and that of the working class reveals the efficiency of the social effort. We possess these figures only for England, and they are too recent to allow of comparison from decade to decade. But many towns have for a long time published separate statistics for each ward; in some of them, the difference between the ward in which the deaths are most numerous, and the ward where they are fewest is becoming gradually reduced. This reduction of the differential mortality constitutes the *index of*

¹ One reason is that the overcrowding of dwellings leads to infection with these diseases at an early age, when the organic resistance is weak. Scanty food, delay in medical attention, and insufficient nursing care also play a part (Rosenfeld).

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social progress,¹ which is one of the components of the index of national progress.

Variations in mortality and lethality in the different social classes imply parallel differences in *morbidity*, concerning which the statistics issued by insurance companies and public health services furnish some information.

Speaking generally, morbidity varies with the occupation and the social level. In the United States, Sydenstricker instituted an inquiry, based on the division of the population into three classes, which he styles as the well-to-do and comfortable—the persons in moderate circumstances—the poor and very poor. Making allowances for age, he found that for 100 cases of sickness in the first class there were 108 in the second and 112 in the third. From the first class to the third, respiratory and nervous diseases, influenza and rheumatism increased in frequency. The same applied to diseases of the circulatory system and the kidneys; however, after the 35th year the first class were more subject to circulatory diseases and the second class to renal diseases.

A recent inquiry has shown that persons whose financial position was greatly reduced from 1929 to 1932 had a morbidity 60 per cent. higher than that of persons—rich or poor—whose circumstances had not varied. Among the unemployed, the morbidity was 39 per cent. higher than among the employed (Perrott, Collins and Sydenstricker).

In twenty-four villages of South Carolina, which depend chiefly on the cotton industry, observations covering more than 50,000 persons have established that the number of working days lost on account of sickness in 1927 (the necessary corrections being made to standardise the different groups according to age) was 5·8—7·8—12·7, according as their daily wages, calculated per head for adults (children being represented by fractions according to age), were 6·50 dollars or over, between 6·49 and 4·50 dollars, or under 4·50 dollars. The difference,

¹ We can compare the same town from time to time, but not one city with another, for a municipality in which some areas are definitely rich and some exclusively poor will present a considerable difference, while another, where the classes are more mixed in each part of the town will show a very slight difference.

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which was greater for men than for women, increased with age ; below 5 years the figures were 6·8—5·5—10·1 ; 45 years and over, 8·5—13·3—25·2. The statistics included only the families of Anglo-Saxon descent who had lived in the district for several generations, so that the effect of economic conditions is seen here in the pure state.

The report of a large American mutual provident association, bearing on 80,000 persons observed from 1912 to 1916, gives a comparison of the following groups : members of the liberal professions, business men and clerical employees ; skilled workmen ; unskilled labourers. In one year, in 1,000 individuals of each group, there were respectively 158—221—278 cases of sickness or accident, each case showing an average incapacity of 25 days in the different social classes ; accidents formed about a quarter of the total (Emmet). Similar differences, based on the absence of children from school, have also been noted (Collins). An inquiry conducted in Massachusetts demonstrated that chronic diseases are more frequent by half among the poorer than among the richer classes (Bigelow and Lombard).

If we analyse the *morbidity due to different affections* we find that bronchitis, pneumonia, tuberculosis, cancer of exposed regions, hernia, valvular disease of the heart, chronic rheumatism,¹ muscular rheumatism, skin diseases, gynæcological affections, abortion, premature delivery, and the pathological results of parturition² are more frequent as we descend the social scale. This preponderance is explained by exposure to weather, the action of irritant agents, fatigue and tardy or incomplete medical care. The part played by social factors is also evident as regards industrial accidents and occupational diseases, as regards scurvy, pellagra, beri-beri, osteomalacia and anæmia, diseases due to

¹ No disease has such a great social incidence as rheumatism. It is thirty times more frequent in children of the working classes than in those of the well-to-do (Glover). Out of 1,000 persons having attended private schools, 58 have heart disease of rheumatic origin ; out of 1,000 having attended free schools, the proportion is 12·5 (Paul and Leddy).

² In the poorest families in Aberdeen, half the women are anæmic, not being able to obtain sufficient food to repair the loss caused by the hæmorrhages of menstruation and parturition. This anæmia is not found in men nor in children (Davidson).

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quantitative or qualitative insufficiency in diet; as regards rickets, caused by lack of sunlight ¹ and faulty diet ²; as regards leprosy, typhus, recurrent fever, dysentery and trachoma, the contagion of which is favoured by promiscuity and want of cleanliness; as regards hookworm, caused either by the conditions of work or by lack of shoes and inefficiency of sanitary arrangements. ³

The differences between the social classes is evident, but less pronounced as regards the frequency (not the issue) of infectious diseases in children, typhoid fever, malaria, influenza ⁴ and venereal disease. On the other hand, appendicitis, gall stones and gout are more common among the prosperous classes. The part played by too rich a diet in the etiology of appendicitis is shown by the rarity of this affection in Belgium during the German occupation, in Germany during the years of scarcity, ⁵ and in Soviet Russia. Appendicitis affects the working class according to the amount of meat consumed and is now found among the African negroes. Gall stones and gout are also related to diet.

Lastly, nervous and mental affections occur in all classes of society, without distinction.

We can compare the *fitness* of the different classes by utilising the statistics of the medical inspection of school children, or those of the recruiting Boards. In Prussia, twenty years ago,

¹ In the parts of India where Hindoo women in easy circumstances live a secluded life (*purdah*), rickets is more common in their children than in children of the other classes.

² Statistics relating to the small town of Remscheid, in Germany, show the effect of economic conditions on rickets: 1923, 26.7 per cent. of infants; 1924, 36.4 (inflation); 1925, 33.0; 1926, 20.6.

³ In nine provinces of Florida 5 per cent. of children were infected with hookworm in families with an income of 700 dollars; 48 per cent. in a group whose income was 200 dollars (Report of the Rockefeller Foundation).

⁴ In the United States, in 1918, the proportion of cases (not deaths) of influenza in the different social classes was as follows (Bruno): well-to-do class, 100; class with moderate income, 108; poor class, 129; very poor class, 144.

⁵ Reduced during the war to a diet of rye bread and potatoes with a minimum of meat, Denmark is the only country in which the mortality decreased from 1916 to 1918.

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the sons of wage-earners engaged in agriculture or industry were passed as fit for military service in a proportion only half that of the sons of persons occupying independent positions.

More than 100,000 examinations made at the Life Extension Institute of New York have shown that signs of disease are less frequent in the independent class than in any of the others, except for myocarditis and valvular disease of the heart; that anomalies are more common in agriculturists, except hernia, dental disease and affections of the nose and throat; lastly, that workmen exceed the average for defects of all kinds (Sydenstricker and Britten).

According to Zingher, natural immunity against scarlet fever, as shown by Dick's test, becomes less widespread as we descend the social scale.

Niceforo states that physical anomalies are more common in the poorer class. The reports of the English Board of Education and those of the United States Children's Bureau support this statement as regards children (Rude).

Social pathology confirms what we have learnt from social anthropology. For physical vigour as for intelligence, as well as for disease and death, inequality is patent between the social classes. Except in extreme destitution this inequality does not exist at birth; it appears during the first weeks of life, becomes accentuated during part of childhood, diminishes later, but never disappears. These differences are reduced by the progress of hygiene and welfare.

It remains for us to determine the part played by heredity on the one hand, and social environment on the other, either by giving rise to a constitutional inferiority, or by producing factors which cause diseases, promote their development or influence their course.

CHAPTER VII

HEREDITY AND ENVIRONMENT

INDIVIDUAL biological variations depend at the same time on nature and nurture, i.e. on heredity and environment, the latter word being used in its widest sense: occupation, conditions of work and of existence, education, training, and habits.

Environment acts on the child, through the mother, from the moment of conception. Social heredity commences at the same time as biological heredity.

The action of heredity and that of environment vary according to the characters considered: the constitution, stature, physical and mental type are in principle determined by heredity, but proper care and a favourable environment will protect a weak constitution, while adverse circumstances will limit growth or ruin a fine constitution.

The properties of most importance to sociological medicine are longevity, physical vigour, intelligence and character.

Bell, from the study of 1594 members of the Hyde family, has drawn up a table, which establishes a very definite relation between the longevity of children and that of their parents. The figures given in the table indicate the average age attained by the children of each group:

Age attained by the Father.	Age attained by the Mother.		
	Less than 60 Years.	From 60-80 Years.	Over 80 Years.
Less than 60 years . . .	32.8 years	33.4 years	36.3 years
From 60-80 years . . .	35.8 "	35.8 "	45.0 "
Over 80 years . . .	42.3 "	45.5 "	52.7 "

The children whose father and mother became octogenarians lived on an average twenty years longer than those whose parents did not attain 60 years. We do not know to what extent this difference can be attributed to heredity. Were the parents who lived to an advanced age in more comfortable circumstances, did they lead a healthier life, were they better protected than the others?

In order to answer this question, Ploetz has studied the mortality of children in several royal families. The environment being uniformly favourable, the action of heredity is seen here, to a certain extent, in a pure state, and we are not surprised to find that the longevity of the parents, in general, governs that of their children.

Beeton and Pearson have compared the longevity of parents and children in two social groups, fairly homogeneous as to the mode of life; the English nobility on the one hand, the Quakers, on the other. The correlation of the longevity of the children with that of each of their parents is in the proportion of $\frac{1}{16}$, while it is from $\frac{1}{16}$ to $\frac{1}{8}$ for a purely hereditary factor such as the colour of the eyes. Heredity therefore takes part in these cases for $\frac{1}{4}$ in the determination of longevity, environment for $\frac{3}{4}$.¹ The hereditary factor would be still further reduced if environments were compared as different as those of the several social classes. An examination of 70,000 cases conducted by the statistical bureau of the Metropolitan Life Insurance Company, and an investigation bearing on 300,000 men insured in thirty-four American companies, confirm the opinion that longevity is influenced by an hereditary factor. But

the advantage that may be expected from a favourable heredity is inferior to that which has been realised by improvement in hygienic and social conditions, and is much inferior to that which might be obtained by continuing on the same lines (Dublin).

¹ This is not Pearson's conclusion. On the basis of a mathematical method of his own, he estimates that longevity is in 50-75 per cent of cases due to hereditary factors, but he is at pains to add that this proportion only applies to the fairly homogeneous groups which he examined. His studies therefore do not lead to results which are valid for the whole population.

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Longevity is often associated with physical vigour, but those of poor physique sometimes attain advanced age.

With regard to intelligence, essentially an innate quality, numerous and detailed studies have established that the intellectual quotient may be raised from 15 to 20 per cent. at least, or decreased in the same proportion, under the influence of environment and education. Perhaps this malleability is more pronounced at an early age, as certain observations which we shall mention tend to show.

Lastly, as regards character, interesting information has been obtained from the comparison of uniovular twins, whose hereditary endowment is identical, with biovular twins, whose hereditary endowment differs as much as that of brothers and sisters who are not twins. This investigation was carried out on men convicted for grave offences. Among the brothers who were not twins 8 per cent. also had been convicted; among the brothers who were biovular twins, the proportion rose to 12 per cent.; among the brothers who were uniovular twins it reached 77 per cent., and this similitude of antisocial reactions was found even when the two twins were brought up in different environments (Lange).

Individual variations, therefore, arise partly from heredity and partly from environment. Is it the same with variations between the social classes? That environment—i.e. occupation, dwelling-place, income, education and medical attention—plays an important part, no one will deny. But it has been maintained that there exists a constitutional inequality among the social classes, which would form to a certain extent distinct races, transmitting their particular hereditary endowment from generation to generation.

This theory may appear plausible when, selecting an extreme example, a group of men practising a learned profession is compared with a group consisting of beggars. But if, leaving aside a small minority obviously defective, the entire population is divided so as to include the whole scale from the independent class to that of unskilled labourers, the biological variations, if due to heredity, should appear at all ages.

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But we have seen—and it is important to lay stress on this fact—that these variations are not observed at birth, nor during the first month of life, at least in countries where poverty is not extreme. They are only manifested after a few weeks, in physical development, morbidity and mortality. No doubt the late appearance of a character is not a decisive argument against its hereditary origin. However, if in proportion as we descend the social scale there existed an increasing constitutional debility this defect would become apparent in the mortality at birth and during the first weeks of life, for the transition from intra-uterine to extra-uterine life, and adaptation to the latter, constitute the severest tests that the infant has to undergo. In fact, we observe nothing of the kind; when the standard of life is not reduced to the lowest level, there is no difference in the mortality at birth between the different social classes.

How, on the other hand, could we reconcile with the hypothesis of a constitutional inferiority of the masses the fact that social reforms and the progress of hygiene have raised the physical level of the poorer classes more rapidly than that of the richer classes? In the course of twenty years the biological variations between the classes become attenuated, as is shown by the examination of children attending private and free schools, by the statistics of general, infant and tuberculosis mortality in the different quarters of the same town, and by the statistics, already quoted, of the insured in the Metropolitan Life Insurance Company, which prove that the longevity of American workers is now nearly the same as for the general population after having long been lower by several years.

The opposite experience was realised in Central Europe during the years of scarcity (war and post-war periods) when the mortality of the middle class increased to that formerly found in the working class.

Some more specific examples may be given.

Infantile gastro-enteritis affects the different social classes very unequally. Without denying that diet and the quality of the milk share in the origin of this affection, some consider that it chiefly eliminates the weakly. But, out of 28,000 infants

born in New Zealand, in 1928, about 14,000 were attended by nurses, with such efficiency that *only one* died of gastro-enteritis. These 14,000 infants belonged to all classes of society, but chiefly to the less prosperous class. "Constitutional inferiority of the masses" is not therefore the essential cause of the predilection shown by gastro-enteritis for infants of the poorer families.

Certain enterprises represent actual social experiments since we can compare the beneficiaries with those to whom the reform does not apply. The weakly and rickety children of the poorest quarter of London, attending the open-air nursery school founded by Margaret Macmillan, became in a few years, mentally and physically, the equals of children of the well-to-do class, although the influence of the social environment to which the children returned every evening counteracted daily the good effects of the school. Children of the same quarter who did not attend this school presented considerable physical and mental retardation.

In Vienna, Hildegard Hetzer and Kaethe Wolf compared the mentality of infants less than a year old, some of whom were sent to a day-nursery on account of the poverty of the parents, while others were brought up in well-to-do and cultivated families. Up to the age of 5 months no difference was noticed, but after that age the children of the latter group developed more rapidly, to the extent that at 11 months, their mental age was a month in advance of that of the poorer children. A certain number of these were then adopted by better-class families; in six weeks they had regained the level of the other children.

Here, the day nursery was the "poor environment", the family the "rich environment". In Detroit, Helen T. Woolley investigated two groups of children comparable from all points of view, but in one group the children were placed in a nursery school conducted according to the principles of modern pedagogy, in the other group the children were brought up entirely by their parents. After six to twelve months they were submitted to a psychological examination; the first group had made uniform progress, the second showed great individual

variation, but little advance, and this difference persisted for several years between these two groups of children.

Gesell and Lord have also observed the beneficial effects of the nursery school on the children of poor families. Some authors have noticed that the progress of the intellectual quotient in children boarded out is much the greater, the better the surroundings and the younger the child.

Kirihara groups Japanese children leaving the nursery school, according to the income or occupation of the father. He finds that the intellectual quotient does not vary from one group to another. But in children who have not attended a nursery school the intellectual quotient is 5 points less when the father is engaged in manual labour. In the primary school the intellectual quotient rises in 50 per cent. of the children of the prosperous class, in 27 per cent. of the children of the working class ; it decreases in 50 per cent. of the former and in 73 per cent. of the latter. Comparing afterwards, until the age of 22 years, the group which continued its studies with that which engaged in manual work, Kirihara noted that the difference became more and more pronounced, especially in girls. Factory work caused a precipitous fall of the intellectual quotient.

The existence of a race of poor and a race of rich being in face of these facts difficult to assert, another hypothesis has been suggested, according to which the social classes do not form fixed groups, but are constantly recruited from new elements, the "strong", biologically speaking, joining the upper classes, the "weak" falling into the lower classes. According to this hypothesis it is not heredity, but selection which creates the social classes.

There is naturally a certain degree of truth in this theory ; however, it could only hold good for a society where perfect equality existed from the cradle as regards education and opportunity. Actually, a child of the well-to-do class, if ill-endowed physically or mentally, is, owing to his environment, his relatives and his material resources, rarely degraded to the lower class. On the other hand, in the working class a healthy and intelligent child will often deteriorate owing to unfavourable

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surroundings, premature work and the lack of opportunity to improve his position.

We have broken down some of the barriers which formerly opposed social ascent, but we cannot say that we have abolished them: the son of the employer and the son of the labourer begin life with unequal chances.

The theory of selection does not sufficiently explain the biological inequality of the social classes. It clashes with most of the arguments we quoted to refute the hypothesis according to which these differences are due to heredity.

We are led to conclude that, except for a group of "submerged" social derelicts, heredity and selection are not the dominant factors of the biological variations found in the different groups of society. To assume that social stratification corresponds to a constitutional stratification is a childish notion, which dates from the time when labourers and peasants—ignorant, overworked, anæmic and often alcoholic—hardly resembled human beings. In Holland, Denmark and Sweden we see a peasant class and a labouring class regenerated by favourable conditions of life.

Indeed, when the social classes are distinguished by race or by stock, when they constitute actual castes, there must necessarily be hereditary differences between them. But the action attributed to race is often more apparent than real; while, in most American towns, the infant mortality reaches its maximum among the negroes, in Baltimore, on the contrary, the coloured population, thanks to attendance at child welfare clinics, present an infant mortality less than that of the Polish immigrants.

Among the Jews in the richer districts of New York the mortality from tuberculosis is 52, while in the poorer districts it rises to 83 per 100,000.

Environment modifies the characters of the race, as Boas has shown in describing the changes in the shape of the skull occurring in children of foreign nationality born in the United States. The children of Japanese parents brought up in the United States are bigger at all ages than those whose growth

took place in Japan; this has been attributed chiefly to the effect of milk. Again, Sir Arthur Keith has discovered in the English, since the end of the eighteenth century, a progressive contraction of the face and palate, due perhaps to new conditions created by industry.

We cannot separate entirely the hereditary factors and those of environment; since the infections and intoxications which affect the parents cause deterioration of the germ¹ it follows that the prophylaxis of infectious diseases, of alcoholism, lead-poisoning and the abuse of narcotics acts on heredity itself. The knowledge of the fundamental part played by the ductless glands removes the barrier raised between heredity and environment; modified in their functional capacity by infections and intoxications, by diet, by fatigue and by the emotions, these secretions act in their turn on the germ; it is not, as formerly believed, exempt from the vicissitudes of the organism which contains it.

However, Karl Pearson and his school have arrived at the conclusion that from 50 to 75 per cent. of the factors in mortality are of hereditary origin, and that environment and poverty have only an insignificant effect. These conclusions rest on the calculation of correlation indexes. But, if this mathematical method is in itself unimpeachable, the results obtained depend entirely on the material observed, its division into categories, and the mode in which each factor is defined, isolated and measured. It is easy to become arbitrary. The biometric studies have never been based on a division of the whole population into five classes; they usually contrast one section of the working class with another. The series observed were often not continuous and interpolations became necessary. Figures have been obtained which are contradicted by the facts in a most striking manner; the correlation between tuberculosis and poverty is given as 0.02, that is to say absolutely nil, since a correlation has a value only over 0.3.

In reality, the relative importance of hereditary and social factors depends on the degree of control exercised on the latter.

¹ That is to say the sexual cells which give origin to the spermatozoid and the ovum, the union of which creates a new being.

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For example, in populations in which the infant mortality is low, the mortality of boys in the course of intra-uterine life and the first year of extra-uterine life is higher than that of girls. On the other hand, in localities, countries and classes in which infant mortality is high, it is more equally divided between boys and girls. The male sex, therefore, possesses a more delicate hereditary constitution, the female sex is relatively more sensitive to the influences of environment, at least before birth and during the first year of life.¹

In countries such as India, where one infant in six dies before it is a year old, social factors evidently preponderate. On the contrary, the more the avoidable mortality is reduced by improvement of the social environment, the greater the importance of the hereditary factor. In a perfect social environment, where the rules of hygiene and safety would be rigorously and universally observed, and where everyone would receive the best medical care, there would be few diseases and few deaths except from hereditary causes, from cancer and from old age.²

It thus appears that the biological inequality of the social classes is due mainly to environment, which acts directly both on the physical and mental condition. The latter, in turn, may be influenced by the physical state; anæmia, adenoid vegetations, dental caries and many other affections have their repercussion on the intelligence, at least on school work, and on character. The analysis may be carried further. Environment acts—

by occupation ;
housing ;

¹ This may explain why physical and moral stress (rise in the price of food, illegitimacy, war) increases the proportion of male births, the girls succumbing to a greater degree before birth.

² The following argument has been raised : when a breeder wishes to obtain the best possible herd he is mainly concerned with the pedigree of his stock. But the breeder does not aim at the gradual improvement of his herd, he creates it. Comparison with the conditions of human society is therefore not justified. On the other hand, the breeder does not neglect the environment ; prize animals are lodged, fed, washed, exercised and looked after with a luxurious attention and precaution that would excite the envy of many families.

income ;
 medical and sanitary organisation ;
 education.

These factors are intimately connected with each other : in an occupation it is not only the conditions of work which influence health, but also the urban or rural situation of the undertaking and the rate and regularity of pay. On the other hand lodgings, food, medical attention and the utilisation of leisure depend to a great extent on the resources. Lastly, education regulates the use to which the income is put, the choice and upkeep of living quarters, observation of the rules of hygiene, and timely recourse to the physician.

Those who have pursued to extremes the analysis of the factors of environment have arrived at the paradoxical conclusion that the influence of any one of them no longer appears distinctly.

Direct methods have given results which are more in accordance with practical experience. In 1916 and 1917 the United States Children's Bureau carried out domiciliary inquiries concerning 14,608 children born in Baltimore in 1915 ; for 12,292 of these children complete information was obtained both from the parents and from the evidence of the social, economic, hygienic, intellectual and occupational conditions of the family.

The first fact revealed by this inquiry was that the infant mortality varied considerably according to the *race and nationality* of the families observed ; it was average among Americans of the white race (95.9 per 1,000 live births), low in the Jews (51.0), high among the coloured race (158.6) and in the Polish population (163.2).

But it does not appear justified to attribute these variations to an hereditary factor, for among the negroes and the Poles wages are very low and many mothers go out to work. On the other hand, in spite of economic conditions which are often unfavourable, Jewish mothers do not go out to work ; nearly all suckle their infants and most of them are well acquainted with the principles of prenatal and infant hygiene ; also, among Jewish mothers, the average interval between successive births is comparatively long.

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In two groups which are similar economically, but different racially, for example, families of the white race and families of the negro race, both earning less than 450 dollars a year, all difference disappears (164.8 and 163.7).

The second factor examined was the *economic position* of the family (father's wages), the influence of which is considerable, as is shown by the following figures :

Wages.	Infant Mortality.
Equal to or over 1,850 dollars . . .	38.3
Between 1,250 and 1,849 dollars . . .	84.3
" 850 and 1,249 " . . .	69.9
" 650 and 849 " . . .	95.6
" 550 and 649 " . . .	107.9
" 450 and 549 " . . .	128.9
Below 450 . . .	164.8

We can hardly unite in the same statistics, infants who are artificially fed (*a*) and those who are breast fed (*b*). Separating the two groups we obtain the following figures :

Wages.	Infant Mortality.
Equal to or over 1,850 dollars . . .	(<i>a</i>) 27.5, (<i>b</i>) 13.3
Between 1,250 and 1,849 dollars . . .	(<i>a</i>) 130.1, (<i>b</i>) 23.2
" 850 and 1,249 " . . .	(<i>a</i>) 117.3, (<i>b</i>) 22.5
" 550 and 849 " . . .	(<i>a</i>) 185.4, (<i>b</i>) 46.1
Below 550 " . . .	(<i>a</i>) 310.1, (<i>b</i>) 61.8

However great may be the importance of maternal suckling for infant survival, this factor is therefore less decisive than the economic position of the family, since artificially fed infants, in the most favourable economic group, show a mortality half that of infants in the least favourable economic group, who were breast fed. By means of Westergaard's method of computation it can be calculated that if all the infants in Baltimore had been breast fed till the age of 9 months, 35 per cent. of those who are dead would have been saved ; but if, without changing their mode of feeding, all had been placed under the conditions of the infants whose fathers earned 1,850 dollars or more, 64 per cent. of the infants who are dead would have lived ; and if all had been at the same time breast fed and placed in a better economic environment the gain would have been 72 per cent., or very little more.

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Whether parents can or cannot *read and write*, other factors being eliminated, makes no difference in infant mortality. But a knowledge of prenatal and infant hygiene plays an important part.

The *district*, considered independently of overcrowding and of sanitary conditions, does not appear to exert any influence; in other words, the neighbourhood has no apparent effect on infant mortality.¹

Overcrowding increases the infant mortality by about one-sixth. It is the same with *defective sanitation*.

Out-door work of the mother during pregnancy, especially if this is continued till the end of pregnancy and during the first following months, increases the infant mortality, apart from the fact that such work is incompatible with suckling. In this matter due account must be taken of nationality and economic conditions. On the other hand, home work, such as was done in the families observed, does not appear to be harmful.

The fact which interests us most is the demonstration of the particular action exerted by each of the three factors: poverty, ignorance of hygiene, overcrowding and unhealthiness of dwellings.

The almost constant association of these factors had hitherto interfered with the determination of the part played by each of them in infant mortality. The investigation carried out at Baltimore has given us for the first time precise data on this point.

The rôle of *economic conditions* in themselves is shown by the following figures: if a group is formed of infants whose mothers are born in America, belong to the white race, are able to read and write, do not engage in outdoor work, have at least seven children, have not given birth to another child in the two years preceding the last confinement, and lastly inhabit dwellings which are healthy and not overcrowded (containing at the most one person per room), all the unfavourable elements often associated with poverty are eliminated; the only variant is the economic position of the family, as a

¹ In England it is otherwise, no doubt on account of the atmospheric pollution by smoke.

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distinct and isolated factor. This group furnishes the following figures :

Salary of Father		Infant Mortality.	
Equal to or over	1,250 dollars	.	20
Between	850 and 1,249 dollars	.	26
"	550 and 849 "	.	40
"	450 and 549 "	.	52
Below	450 "	.	71

The influence of poverty in itself, independently of the factors with which it is often associated, is thus considerable, the infant mortality more than trebling itself according to the income.

The effects of *health education* are of no less importance as is shown by comparing the infant mortality in the Polish population with that of the Jewish population. Whether the comparison is made between those with the same wages, the same dwellings, the same outside work performed by the mother, or the same rate in the succession of births, the infant mortality is three times greater among the Poles than among the Jews.¹ This is due to the fact that very many Jewish mothers attend prenatal and child welfare clinics, and are thereby better instructed in the principles of child welfare.

We have already mentioned the influence of *overcrowded and insanitary dwellings*. The following is one example among many : at Liverpool, 3,000 model dwellings were built in which 11,000 persons recruited from slum dwellings were lodged ; without any rise in the wages of these families their general mortality was reduced by a quarter and their infant mortality by half.

A recent investigation relating to tuberculosis confirms and supplements the facts which we have just mentioned. Unimpeachable from the scientific and statistical point of view, it deals with 2,963 families living in two adjacent districts in the north of England. According to this investigation, conducted by an experienced hygienist, Dr. Bradbury, tuberculosis is not usually the cause of poverty, but its consequence. Poverty, overcrowding and underfeeding are, independently or con-

¹ Unfortunately it was not found possible to compare a Polish with a Jewish group in which all these factors were equal at the same time, health education excepted.

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jointly, the social factors in tuberculosis. Insanitary housing does not appear to play an important part. Other things being equal, the population of Irish extraction pays a tribute to tuberculosis one third higher than that of the English, but this may be the result of their mode of life or of a less widespread immunisation.

Children who as infants have been brought to the child welfare clinics become less often tuberculous than others.

In short, the factors of which the effect has been demonstrated, in England and the United States, are poverty, overcrowding, underfeeding and absence of health education.

It remains for us to consider the *moral factors*. Some imagine that poverty is always accompanied by neglect. Nothing of the kind; at Philadelphia, in an investigation on housing, Craig reported that the proportion of well-kept homes reached 73 per cent. among comparatively prosperous families, 74 per cent. in families of moderate means and 65 per cent. among poor families. As a rule, the mothers do not neglect their homes any more in the poorer than in the richer classes; they may commit errors and be influenced by absurd prejudices, and the necessities of existence may oblige them to leave their homes and their children for part of the day, but it cannot be said that there is a higher proportion of negligent mothers or housewives in one social class than another. On the contrary, many women deliberately sacrifice their health in the performance of overwhelming duties, as can be seen in the families of the unemployed.

In the poorest surroundings, however, a hard and monotonous existence, without joy and without hope, tends to dislocate life. But this condition is found chiefly among the destitute; in other social groups it only occurs exceptionally.

CHAPTER VIII

HEREDITARY FACTORS

"EUGENICS," established in 1883 by Sir Francis Galton, a cousin of Darwin, "is the study of all the agencies under social control, which may improve or impair the inborn qualities of future generations of man, either physically or mentally."

In order to raise the health of the population to the highest level possible eugenics seeks to improve its hereditary endowments, while euthenics aims at improvement of the environment, using the word in its widest sense to include occupational, domestic, economic, sanitary and educational conditions.

In former times religious and lay legislators had already made laws tending to eliminate the unfit, multiply the descendants of the best stocks and maintain certain lineages in a pure state. But rational eugenics can only be based on the science of heredity—genetics.

The embryologists and the geneticians have discovered the essential elements of the mechanism which governs the hereditary transmission of individual characters.

It was formerly believed that paternal and maternal heredity were completely blended, some features appearing more prominently in certain children, while other features became attenuated; each union, therefore, added to this patrimony without subtracting anything from it.

We now know that hereditary characters do not become diluted in this way, but constitute independent, indivisible units, passing from one generation to another, like coins. The number of hereditary units possessed by an individual being fixed in man, as in all other living species, the father and mother each transmit to the child half the total number of the units which they them-

selves possess; the units not transmitted remain definitely foreign to the child. The analysis of this mechanism is important. The different cells which compose the bodies of men, animals and plants contain, in the elements of their nuclei that are called chromosomes, a series of ultramicroscopic units coupled in pairs—the genes—which are the material and living basis of heredity.¹ Each gene (or a combination of genes) determines an hereditary trait, and in each pair of genes in an infant, one gene is derived from the father, the other from the mother. For example, a paternal gene “tallness” is associated with a maternal gene “shortness”, a paternal gene “fair hair” with a maternal gene “dark hair”, etc. The series of paired genes varying with each individual creates the physical and mental personality inherited. All the cells of the same individual have, in this respect, an identical constitution, for when one cell is reproduced by division, the two daughter-cells possess the same series of genes as the parent cell. But all the cells of the individual, by successive division, are derived from a single parent-cell, the ovum, formed by the union of the paternal reproductive cell—the spermatozoid—and the maternal reproductive cell—the ovule.

If the reproductive cells were formed like the others the number of genes would be doubled in each generation; to the pair of genes of the spermatozoid would be added those of the ovule; for each hereditary character the child would receive the two paternal genes (one derived from the paternal grandfather and the other from the paternal grandmother), and the two maternal genes (one derived from the maternal grandfather, the other from the maternal grandmother). But this is not the case; when the reproductive cell is formed, in the man and in the woman, it throws off *at hazard* one of the genes of each pair of the series.

At the time of fecundation the demi-pairs of genes carried by the spermatozoid unite one by one with the demi-pairs of genes carried by the ovule; the “height” couple, for example, is

¹ The number of chromosomes and the number of genes are constant for each species; 48 chromosomes, and no doubt several thousand genes in man. Morgan has estimated at 4,000 the number of genes in *Drosophila*, an insect; 400 of these genes have been determined and localised.

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formed by the union of a "height" gene transmitted by the father with a "height" gene transmitted by the mother. But the first may be derived either from the paternal grandfather or from the paternal grandmother, according to whether, at the time of formation of the spermatozoid in the father, the paternal gene (which comes from the paternal grandfather of the infant) or the maternal gene (which comes from the paternal grandmother of the infant) has been preserved. In the same way, the gene transmitted by the mother may be derived either from the maternal grandfather or from the maternal grandmother. In each of our characters one of our grandparents from our father's side and one of our grandparents from our mother's side are represented, the other two grandparents not being represented. This distribution differs in each character; we may, for example, inherit "height" genes from our two grandfathers, "hair" genes from our two grandmothers, "music" genes from a grandfather of one lineage and from a grandmother of another lineage, etc. The number of couples of genes being high, the variety of possible combinations is very large in children of the same father and the same mother. This is why two brothers or two sisters are not identical.¹

The combination, by which the four grandparents would transmit the same number of genes each, is evidently an exceptional chance. We inherit half from our father and half from our mother, but not a quarter from each of our grandparents or an eighth from each of our great-grandparents. We have not "a drop of blood" from many of our ancestors. As soon as it is eliminated, a character presented by one of our grandparents will not reappear in our descendants, unless it is reintroduced by a conjoint.

Let us examine the combinations formed by the union of the paternal with the maternal series of genes, as regards the colour of the hair, for example. If the paternal and maternal genes are identical—"dark haired" or "fair haired" in both—this character will be retained in full in the child, and will be eventu-

¹ With the exception of uniovular twins, which are derived from a single ovum, and consequently from a single spermatozoid and a single ovule.

ally transmitted to the following generation. But if the child inherits from one of its parents the "dark-haired" gene, and from the other the "fair-haired" gene it will have dark hair, the former being *dominant*, the latter *recessive*.¹ Possessing the two genes it will transmit, sometimes the one sometimes the other to each of its own children. Those which will have received from him the "fair-haired" gene and which inherit from his partner an identical gene will be blonde, owing to the absence of the dominant "dark-haired" gene. This combination may never be realised, or may only occur after many generations. Thus, characters silently transmitted reappear after a long period of latency; this is what is called atavism. But it is necessary for these characters to have existed in an ancestor and not to have been eliminated in the course of generations.

Consanguinity will have satisfactory results if the lineages to which the parents belong do not possess any pathological characters, manifest or latent. If they do so, the chances of these characters appearing are doubled by consanguinity.

When the hereditary characters of the progenitors are known, Mendel's laws enable us to foresee certain of these traits which will appear in the descendants, or at least to predict the chances of their appearing. These laws and the study of human pedigrees form a scientific basis for conjugal selection viewed from the eugenic standpoint.

If everything were limited to the mechanism we have just described, the variations of heredity would be due only to the considerable number of different combinations formed by a limited series of elements.

In reality, however, new characters, not existing in the progenitors, may appear, either by a novel combination of genes, or by the modification, multiplication or reduction of genes, causing sudden *mutations* which are observed in nature and have been reproduced experimentally by the action of heat, cold, X-rays

¹ We have simplified matters to make them more clear. When the paternal and maternal genes are different without any of them being dominant, the character they represent will appear in the child in an intermediate or even a variegated form. Thus, in animals a "white coat" gene united to a "black coat" gene may produce either a grey-coated or a spotted or striped animal.

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and chemical substances. Environment, therefore, may influence the appearance, intensity and earliness of hereditary characters.

The genes determine the anatomical, physiological and psychological characters, normal or morbid, which make their appearance, sometimes at birth (they exist potentially at the time of conception), sometimes later. There are, for instance, the colour and texture of the hair, the colour of the eyes, complexion, height, form of the body and its different parts (external and internal), obesity, vigour, tendency to longevity and fecundity, constitution. We are born with certain physical and mental properties, a certain vital rhythm, a certain functioning of the ductless glands which determine leanness or obesity, vivacity or sluggishness, placidity or excitability.

The hereditary psychological factors bear on intelligence, special aptitudes (for music, drawing, mathematics, mechanics), temperament and even moral tendencies. The analysis of physical and mental types, often closely correlated, is the object of *biotypology*, of which *characterology* is not the least important chapter. Dealing, not with the description of the average or ideal man, but with the study of individual variations, these two sciences emphasise the relations of the physical to the mental. They show how different influences, acting in the course of life, can modify the type created by heredity.

The hereditary pathological factors are numerous, and in order to understand their action, it is important to distinguish between congenital, hereditary and familial diseases.

Congenital diseases are those which the infant manifests at birth, in distinction to those which appear later. Some originate from hereditary factors, others are due either to infection of the infant by the mother (heredo-tuberculosis, heredo-syphilis),¹ or to accidents, intoxications, diseases, privation or overwork from which the mother has suffered during pregnancy.² Some also result from the circumstances of parturition.

Familial diseases are those which occur with exceptional

¹ The disease in this case is not inherited, but acquired by the passage of micro-organisms from the mother to the infant during pregnancy.

² These causes, as we shall see later, may also act by damaging the maternal or paternal sexual cells (blastotoxina).

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frequency in members of the same family. Sometimes these affections are due to environment, the mode of life or the occupation; in this case they are only familial because the same causes act on different members of the family. They may also be due to contagion or to heredity.

Hereditary diseases are transmitted by lineage, sometimes in the same form, sometimes under different aspects.¹ They may appear at birth, in infancy, in adolescence or in mature age. In the course of successive generations they may become attenuated, disappear, change their form (a rare eventuality), or become more frequent, more severe, or appear earlier.

The number of these diseases is considerable, about 200, but excepting myopia they affect only a small proportion of the population. Important as they are from the individual and familial point of view, they do not constitute a fundamental problem for social pathology, with the exception of mental affections, which are not all hereditary, and also not necessarily hereditary.

These anomalies, like all hereditary affections, arise either from fixed pathological factors transmitted according to Mendel's laws (when their occurrence can, to a certain extent, be foreseen), or from deterioration (blastotoxia) of the paternal or maternal reproductive cells in the course of their formation and till the act of procreation. There are various influences at work here—syphilis, tuberculosis, alcohol, lead, thallium and nicotine. In these cases pathological heredity often assumes different forms in brothers and sisters, as well as from one generation to another; a mentally defective parent may have one child epileptic, another psychopathic, a third an idiot, and these in their turn produce offspring in which the particular defect to occur cannot be foreseen. It seems that these anomalies, after a certain number of generations, become attenuated or disappear, if the cause which gave rise to them ceases to act.²

¹ Some of them, such as hæmophilia (liability to hæmorrhages), affect almost exclusively the male sex, but are transmitted only by the female.

² Hereditary changes have been produced experimentally, both in the male and female, by the action of the X-rays, radium, heat, alcohol and under-feeding, and it has been found that these become attenuated or disappear after some generations. Alcohol may also give rise to

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As previously remarked, mental characters are generally on a par with physical characters: the whole organism is strong or weak, normal or abnormal.

The heredity of mental anomalies creates a grave social problem, the importance of which becomes daily more apparent. Among the offspring of a tainted couple, or even of a tainted individual, we witness the multiplication of cases of mental degeneration and insanity, of idiocy, epilepsy, blindness and deafness: alcoholism, drug addiction, pauperism, vagrancy, prostitution and crime attain in these families an unusual frequency. The situation is often aggravated from generation to generation, the abnormal intermarrying both from choice and necessity. Such lineages generally become extinct after five generations at the most, as the result of voluntary abstention from procreation, suicide, imprisonment or segregation and lastly from the high rate of mortality to which these social derelicts are exposed. They constitute a kind of inferior race, living parasitically and sometimes at enmity with society. There is no proof, as has been maintained, that this class is increasing, nor that it contaminates the healthy elements.¹ The most tainted form at the most from 1 to 2 per cent. of the population; the proportion of those with less marked and less severe hereditary defects hardly exceeds 10 per cent.

From this group we must distinguish individuals who present the same mental and social anomalies acquired accidentally and not by heredity; 5 per cent. only of mental defectives are issued from manifestly abnormal parents; 9 per cent. have abnormal brothers or sisters (Tredgold); but we may suspect an hereditary influence, i.e. a latent transmission of recessive characters, in half these cases as a maximum. It is no less true that many alcoholics, vagrants, prostitutes and criminals are the persistent mutations. The heredity of lesions due to organ-destroying sera has been disputed. Some consider that by the action of the X-rays or ultra-violet rays superior types of men, animals and plants can be created.

¹ In France, in 1906, 100 families of paupers, vagrants, chronic hospital cases and prisoners were found to have had 285 children; 100 working-class families, 395; 100 families of clerical employees, 290; 100 families of the richer class, 358. The infant and child mortality in these groups had been respectively 335, 233, 196, 208 per thousand (Marsh). The insane, on the whole, are below the average in fecundity (Dahlberg).

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victims of circumstances rather than of heredity, as is shown by the results of social measures for the prevention of these conditions.

To sum up, after deducting hereditary affections properly so called, the state of health of the parents may affect the infant before birth in three different ways :

1. Infectious diseases, intoxications, and probably also alimentary disorders (pellagra, beri-beri) and general diseases (diabetes, gout, affections of the heart, blood vessels and kidneys) from which the father or mother suffered may cause changes in their sex cells. The child is then born with physical or mental defects which may be transmitted to its offspring.

2. In the pregnant woman anyone of these causes, including ill-nourishment, overwork and distress, may interfere with the development of the infant which will die before birth or be born puny.

3. Infectious diseases of the pregnant woman (especially syphilis) may be transmitted to the infant during intra-uterine life. If treatment is not instituted during pregnancy, the infant will succumb before birth or will be born infected, the birth occurring either prematurely or at term.

As we have seen, it is far from certain that the different social classes possess a different hereditary endowment. Eugenics, therefore, only interests sociological medicine in proportion as it collaborates with eugenics in improving the health of the masses and reducing the number of social defectives.

We will leave aside problems relative to unions between individuals of different races ; these problems are of considerable importance as regards colonisation and emigration : but they do not arise from our subject, and are not yet solved.¹

¹ There is a widespread opinion that unions between different races (white, yellow, black), or between different ethnic groups (nordic, mediterranean, alpine), are unfavourable from the hereditary point of view, but in spite of much research, nothing is proved in this respect. Such unions introduce new factors into a family or a population ; according as these factors are good or bad, this will be favourable or unfavourable. Each race and each ethnic group possesses on the whole a more or less different hereditary endowment from that of the others. It is in no way proved that one or other of these stocks is superior from

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Eugenics, to avoid harmful influences affecting the sex cells, requires from social hygiene a campaign against alcoholism, narcotics, venereal diseases and tuberculosis. It fears the dysgenic influence of war. Its programme includes a *negative action*, to eliminate abnormal stocks and restrict the multiplication of inferior stocks, and a *positive action*, to increase the offspring of superior stocks and promote all unions which are favourable from the hereditary standpoint. Let us examine successively these four points.

There certainly exist stocks which are *cacogenic* or *dysgenic*. Several monographs have been devoted to this subject; in France, Switzerland and the United States especially, such lineages have been described under assumed names—(Nams, Ismahels, Hill-Folks, Kallikaks, Zeros, etc.). One of these families, the Jukes, on account of its defectives, its insane, its epileptics, its deaf-mutes, its blind, its alcoholics, its prostitutes, its vagrants and its criminals cost the American Treasury two million dollars between 1800 and 1915 (Estabrook). The hereditary influence in some examples is emphasised by the fact that the same man has successively produced two lineages, one healthy resulting from his union with a woman well endowed from the hereditary view-point, the other dysgenic resulting from his union with a woman who was hereditarily tainted. Lidbetter, in the same way, has followed up the heredity of pauperism.

These stocks create a grave moral problem in causing social disturbance, and at the same time a serious economic problem by overcrowding charitable institutions and penitentiaries. The maintenance for twenty years of an insane person in an asylum or of a convict in a prison represents an expense of more than £1,000 for the public authorities; the education of a mental defective, of one born blind, or of a deaf-mute costs from five to ten times as much as that of a normal child.

As regards the insane, vagrants and criminals, *segregation* has been applied at all times, with a view to assistance, punishment or the protection of society, but till recent years no attempt had

the biological standpoint. Very few nations are homogeneous from the racial point of view. The Jews were already a composite people before they became dispersed.

been made to use it as an eugenic measure ¹ This is why in all countries examples have been recorded similar to that reported by A. Marie : an insane woman, born in 1800, interned at the asylum of Navarre, had an insane daughter who married an insane man ; they produced two imbeciles, a boy and a girl ; the latter, alternately interned and liberated, gave birth to six idiots and a stillborn child.

The segregation of defectives and the mentally abnormal should commence at an early age ; mental hygiene clinics and school medical inspection will ensure their detection. These children will be placed, according to the nature of the case, in special classes, special schools, colonies or agricultural colleges where they learn a trade suitable to their condition. Acquired habits are so powerful that the defectives, if not the abnormal, may afterwards be released under guardianship, both in their own interests and that of the community. Trained in this way, three-quarters of them earn their living, but they still remain in the lower strata of society, and their offspring is tainted in a higher proportion than that of the general population

Objections have been raised in the name of individual liberty ; but, to educate a defective so that he can escape poverty and conflict with society is to protect him. Is it necessary to wait till, exploited and led astray, he becomes at the same time a victim and a rebel ? The cost of this scheme has also been objected to. Prevention, however, always costs less than cure.

In order to uphold public order, pronounced defectives, and the dangerously abnormal should be submitted to continued segregation, which, by making procreation impossible, is no less advantageous from the eugenic than the social point of view, provided it is carried out as soon as the anomaly becomes manifest.

It would be unjustifiable and, moreover, impracticable to extend segregation to all the tainted. For them *sterilisation* has been recommended. This procedure has been authorised or even ordered in certain cases and under the strictest precautions in twenty-eight States in the United States, in the province of Alberta in Canada, in Denmark, Norway, Sweden and Finland,

¹ It has, however, been tried successfully since 1890 among the cretins of the valley of Aosta who are now completely extinct.

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in Switzerland, especially in the canton of Vaud, and in Germany.¹ In man the operation (ligature of the vas deferens) is simple, and free from danger (local anæsthesia is sufficient). It causes no mutilation and no physiological or psychological change, other than sterility; the sexual power remains intact. In women the operation is more severe (ligature of the Fallopian tube) because it generally necessitates opening the abdomen; but, here again, except for sterility, the organism is unaffected.² Sometimes those who are tainted demand the operation themselves. It has the double advantage of being radical as regards prevention of offspring,³ and of avoiding in many cases, but not in all, segregation, which is tyrannical for the individual and onerous for the State. However, sterilisation offends the conscience of many people, and its indications remain exceptional. In any case, both segregation and sterilisation should be judiciously applied, and be based on well-established scientific data.

Rapid results must not be expected for, on the one hand, mental anomalies are only due to heredity in a fraction of all the cases; on the other hand, hereditary characters, the transmission of which it is desired to suppress, are for the most part the expression of recessive factors. If we succeeded in detecting all abnormal cases before puberty and sterilised or segregated them till the expiration of the period of fertility we should only have eliminated a small proportion of cacogenic stocks. For one lineage thus suppressed, ten others are perpetuated, in which the dysgenic factor persists in a latent state, ready to produce its effects as soon as the hazard of unions liberates it from the dominant factor under which it is hidden. Moreover, new stocks of abnormals may be constituted.

In arresting the transmission of undesirable factors as soon as

¹ In the United States 16,000 sterilisations have been performed in 20 years, and 56,000 in Germany in 1934.

² Sterilisation by the X-rays is dangerous because it may cause certain lesions, and also because it is often equivalent to castration, by suppressing the internal secretion, as well as the external secretion of the sex glands. Methods of temporary sterilisation by the injection of chemical or organic substances are under investigation. They may give a new aspect to the problems of sterilisation and birth-control.

³ It also influences the antisocial tendencies of certain abnormal subjects.

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they become apparent we shall only gain ground little by little. This policy is nevertheless indispensable in the preventive campaign against hereditary diseases and antisocial tendencies.

While endeavouring to suppress the tainted stocks, it should also be desirable to *promote the fecundity of the exceptionally endowed*. But, for evident reasons, this is a task which is both impossible and futile. First of all, unless these exceptional individuals were always marrying among themselves, the qualities transmitted would become rapidly attenuated from generation to generation. In the second place, the cases are so few in comparison with the whole population that, as Leonard Darwin, the present head of the English eugenic school, has said, to multiply the descendants of a superior man is like sharing the fortune of a millionaire among all the inhabitants of a country; the collective effect is nil.

In order to produce an effect on the national hereditary stock, eugenics would have to *reduce the fecundity of those whose hereditary qualities are clearly below the average, and increase the fecundity of those whose hereditary qualities are clearly above the average*.

Do these two groups exist, and are they recognisable as such or must each case be studied individually? Among certain eugenicists there is a tendency to assume that, on the whole, unskilled and semi-skilled labourers will have an hereditary endowment below the average, while the middle classes will be more favoured in this respect. As we have seen, it cannot be affirmed that this is the case, and a section of the normal population is constrained to do subordinate work. Let us suppose, however, that this inequality was proved. By what means can the families of manual workers and day labourers be induced to limit their offspring? It has been proposed to exercise economic or fiscal pressure, but experience shows that poverty usually increases fecundity instead of restricting it.¹ Are we to refuse

¹ In the animal kingdom, observation and experimentation prove that underfeeding increases fecundity. In the United States the birth-rate has increased in families reduced by the crisis from comfort to poverty, it is higher among the totally than among the partially unemployed, and among the latter than in the families of those with daily employment (Sydenstricker and Perrott).

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all aid to families which have produced more children than they can maintain? This would result in running the same risk, and would also strike the innocent. Should undesirable parents be sterilised? This would be too arbitrary. We can advise all families not to incur expenses which exceed their income. This sound advice would be better listened to if we improved their conditions of existence. We must not therefore think of measures of repression, but rather of a liberating action which, being of an economic and social order, does not concern eugenics.

On the other hand, how can we increase the fecundity in the mass of families whose hereditary qualities are above the average? To this effect the scale of taxes and estate duties has been changed in several countries; the farmer's estate has been made inalienable and indivisible; family allowances, premiums for babies, assistance for large families, pensions for mothers and prenatal protection have been instituted; celibates and families without children have been subjected to special taxation. But these measures are blind from the eugenic standpoint. They favour bad lineages as well as good. It is not only the craving for comfort, but the desire to rise (that social capillarity so well described by Arsène Dumont) which leads families to limit their offspring. We may add that the material conditions affecting young families, the housing question in towns, and the fear of unemployment do not encourage fecundity.

As we have seen, eugenics proposes measures (sterilisation and segregation) the adoption of which would reduce, slowly but surely, the number of social derelicts.

On the other hand, improvement of the general hereditary stock by modifying the relative fecundity of different social classes remains a theoretical postulate, first of all because it is not proved that these classes differ among themselves in their hereditary characters, and secondly because we have no means at our disposal to diminish or increase the fecundity of a social group.

But eugenics may act on the population as a whole by educational measures and it may intervene by way of instruction and advice in individual cases.

To spread knowledge relating to heredity; to enlighten parents,

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adolescents and young couples on these questions ; to awaken the sense of responsibility in marriage and procreation, is to create a *eugenic conscience*.¹ On the other hand, eugenic offices have been instituted, such as the Eugenic Record Office of Cold Spring Harbour (Long Island, New York), which possesses nearly a million records, and which instructs those interested on the probable consequences of a proposed union.

Lastly, marriage clinics have been established which are spreading over the whole world, their principal object being to determine the state of health of future couples, and especially to detect in them contagious diseases. As a rule, less attention is paid at these clinics to the study of hereditary antecedents, which are much more difficult to establish and interpret ; this limitation is regrettable. In each case it would be necessary to reply to the following questions :

(a) Can a given individual marry, either immediately or after a certain interval, without danger of infecting his or her partner, and more generally, without any grave risk of the future of the family being compromised by the physical or mental condition of the interested party ?

(b) If the answer is in the affirmative for both the man and the woman contemplating marriage, can they be advised to have children, limited or unlimited in number ? Here several considerations come into play ; the state of health, the earning capacity, and the hereditary endowment, not only individually, but collectively for the two.

In the Argentine, Turkey and Yugoslavia (for the male sex), a medical examination is compulsory before marriage ; in Uruguay facilities are given for this examination ; the Soviet Republic demands a certificate of health from would-be couples. In all these countries the information thus obtained does not constitute a legal obstacle to marriage except in the case of contagious diseases. Denmark, Sweden, Norway and thirty-three States in the United States² prohibit marriage in persons

¹ Many States in the United States possess National Eugenics Boards, appointed by the Government. The Uruguayan Code of infant protection enacts eugenic measures. There is an international Federation of eugenic organisations.

² Of which seven make medical examination before marriage obligatory, either for the man or for the man and woman.

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affected with contagious or hereditary diseases, and declare marriages contracted after a false declaration of health to be null and void. Apart from the effectiveness of their enforcement, which varies, these laws have an educational value.

Researches relating to heredity should be encouraged and multiplied. Our knowledge of this subject is fragmentary and uncertain on many points. But eugenic investigations are being pursued, and they sometimes embrace a whole State. Institutes for the study of heredity have been opened in many countries, and the subject is discussed at scientific societies and in special journals.

Eugenics exerts a moral action by submitting our instincts, passions and interests to the control of reason, by promoting the sense of responsibility of prospective parents towards their descendants and towards society, and by recommending healthy families to multiply, even at the price of comfort. The vagaries of certain utopian minds can travesty the mission of eugenics only among ill-informed people.

Having considered the variations of the population in quality it is necessary to examine its variations in *quantity*. As we have seen, the two questions are inseparably united.

The problem may be studied from the view-point of the whole of humanity, of a nation or of a couple.

The *population of the world* has quadrupled since the eighteenth century, and doubled during the last 100 years.¹

Will the food supply fail one day? If we consider how much the extent and still more the output of cultivated areas may be

¹ 465 millions in 1650, 660 millions in 1750, 840 millions in 1800, 1,100 millions in 1850, 2,100 millions to-day. Three centuries ago Asia contained 54 per cent. of the population of the earth, to-day it is 52 per cent.; Europe 21 per cent., to-day 28 per cent. Europeans and their descendants form a third of humanity, other populations increase less rapidly, on the whole, on account of their high death-rate. There is no "rising tide of the coloured races", and to produce it the death-rate in the yellow and black races should fall considerably, while the birth-rate remained high. The proportion of Slavs is increasing because their mortality decreases, without any parallel decrease in their birth-rate, but this may come. As a general rule, after a few years, a reduction in mortality is accompanied by a reduction of the birth-rate.

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increased, if we take into account the possible improvements in breeding and in pisciculture, if we allow for the future conquests of science, there appears to be no need to be pessimistic. In reality, humanity lacks less than ever of the means of subsistence, but it does not yet know how to transport and distribute them. Formerly, one county suffered from scarcity when the corn was abundant in the neighbouring region. In the same way corn has been burnt in the locomotives of America while part of the Chinese population was dying of hunger. However difficult may be the problem of the distribution of corn and rice between different countries, it is not beyond human ingenuity and will. The fear of a universal scarcity of food caused by over-population of the earth is premature and probably chimerical. We suffer from under-consumption, not from under-production. The problem is of an economic and political order.

As regards particular *nations*, variations in population depend, on the one hand, on its spontaneous tendency to multiply, on the other hand, on the limitations imposed upon it by the means of subsistence, by disease and war, and by the desire for security and well-being. Malthus expressed this antagonism in a mathematical formula, since interpreted with a rigidity which was not intended by its author.

Primitive groups have, as a rule, a stationary population, extremely scattered in the case of tribes living by hunting. In Europe, America and Japan, the population, formerly nourished by a rather crude system of agriculture and breeding, decimated by war, famine and disease, slowly increased till the eighteenth century. During the nineteenth century it increased rapidly, owing to the progress of technique and medicine :

Great Britain.

1066	.	.	.	1,500,000 inhabitants (approximate estimate)			
1415	.	.	.	3,000,000	"	"	"
1509	.	.	.	4,000,000	"	"	"
1603	.	.	.	5,000,000	"	"	"
1714	.	.	.	5,750,000	"	"	"
1801	.	.	.	8,892,000	"	(census)	"
1901	.	.	.	32,527,843	"	"	
1921	.	.	.	37,885,242	"	"	
1931	.	.	.	39,947,031	"	"	

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Japan.

(Not counting Corea, Formosa and Sakhalin.)

1723	26,000,000 inhabitants
1846	.	.	.	.	.	27,000,000 ,,
1931	.	.	.	.	.	64,000,000 ,,

In some countries the population is decreasing. This is the case in several regions of equatorial Africa, and of the Pacific, where the benefits of colonisation have not yet compensated for its disturbing influence; natality diminishes, while mortality remains high. On the other hand, China, with a high mortality and birth-rate, appears to have arrived during the last century nearly to the point of saturation. War, famine, poverty and infanticide¹ remove the proportion of human beings which, in its present state of organisation, this country is incapable of supporting. This is the law of Malthus applied in all its horror.

Most other countries show a natural increase in population,² which is measured by the difference between the annual number of births and the annual number of deaths per 1,000 inhabitants.

For two centuries in some countries and more recently in others, both the birth-rate and death-rate have gradually declined, although at certain periods this trend has been reversed.

Generally speaking, the birth-rate drops more quickly than the death-rate, with the result that the population increases more and more slowly; the annual rate of increase varied from 1.3 per 1,000 in Austria to 23.5 in Costa Rica (1932).

However, in India and in Puerto Rico, the birth-rate is actually increasing,³ and in Spain, Lithuania, Ceylon, the Straits Settlements, Federated Malay States and the Philippine Islands, the decrease in the death-rate is much more pronounced than that of the birth-rate, so that, contrary to the general trend, the population of these countries increases more and more rapidly.

Lowering of the birth-rate involves a reduction in the average

¹ Ceccherelli estimates at 500,000 the number of new-born female infants sacrificed every year by their parents.

² Without taking into account immigration and emigration.

³ It has increased in Germany in 1934 and, so far, in 1935, as a result of premiums and privileges granted by the State for marriage and the rearing of children. This increase may thus be of a temporary nature.

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age of the mother at birth, for the limitation of children does not affect young women. The succession of generations is thus accelerated, but a decreasing birth-rate coinciding with an equally decreasing death-rate leads to a progressive rise of the average age of the population. The number of children diminishes, that of old people increases; we should therefore soon expect to see a rise in the death-rate and a still further fall in the birth-rate. To make a legitimate comparison it is necessary to standardise the birth rates and death-rates by reducing them to what they would be in a population whose age distribution remained stationary. We then find that, for instance, in Germany, in 1929, instead of presenting a surplus, the births showed a deficit of 2.1 per 1,000 as compared with the deaths. In other words, although the absolute number of births exceeded that of the deaths, the number of infants born was not sufficient to replace the persons who reached the limit of the period of fertility during the year. The deficit was not apparent, but will manifest itself in the near future.

The true index in this respect is not the birth-rate, but the fertility, i.e. the number of infants having reached the age of one year, to whom 1,000 women have given birth. For 1926-7 this number was as follows :

63	infants in Austria
66	" " Germany, Great Britain, Esthonia
67	" " Sweden, Switzerland
71	" " Belgium, Latvia
74	" " France
81	" " Czechoslovakia
98	" " Holland
101	" " Italy
108	" " Spain
116	" " Poland
137	" " Bulgaria

Fertility is higher everywhere in the country than in the towns. We have already remarked that if in general, since the nineteenth century at least, it is lower in the well-to-do than in the working class, there are countries where this "differential fertility" is little marked; it is even reversed in Stockholm and in the large German towns.

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We are not concerned here with the political and economic reasons for which each country wishes to increase its population in comparison with that of other countries, nor shall we consider the subject of migrations. The essential fact is that a stagnant population means a slackness of economic and social life. Thus an increase in the population appears to be desirable in principle. Moreover, family life is only complete in families possessing at least three children, which is the number necessary to give a moderate increase in the population. Still, these families should enjoy a minimum of peace and comfort. This is a question of technique and organisation in the national and international domain. For a given country, the population policy is inseparable from the economic and social policy. Here there are four factors to be considered : the extent of the country, the number of the population, its standard of living, and its economic and technical organisation. A scattered population can only have a rudimentary economic organisation ; its productivity and its standard of living remain low. On the other hand, a population which becomes too dense will be compelled to lower its standard of living because its agricultural and industrial output is not proportional to the increase in the amount of labour and capital utilised ; this is known as the law of diminishing returns ; however, the progress of science and technique may overcome this difficulty. Lastly the distribution of wealth must also be taken into account, for the population is at the same time the producer and the consumer.¹

All this shows that we cannot fix a uniform rate for the optimum density of the population ; it varies according as it concerns a people living by hunting, by breeding, by agriculture, or by industry ; it varies in each country in different areas, with the distribution of the inhabitants between town and country, with technical and social improvement,² with the possibilities of exportation, and with the spiritual conception of life. The

¹ This fact must not be forgotten when the unemployed are considered as representing an excess of population.

² According to the international indices, the agricultural productivity of India is 85, that of Belgium 221, so that with 195 inhabitants to the square mile, India is overpopulated economically in comparison with Belgium which has 699.

optimum density is a question of time and place, of world and local conditions, and of national and international organisation.

As regards particular *families*, the number of births is determined by biological, economic and psychological factors. Apart from individual sterility, due to malformations or more often to disease, the tendency to fecundity is an hereditary characteristic which grows rapidly weaker, at any rate in certain stocks. Among 2,474 Swedish families of the nobility, investigated by Faulbeck, 1965 became extinct after 225 years; in the sixth generation, 70 per cent. of the marriages were sterile. There are undoubtedly biological factors concerned with the birth-rate. According to Brownlee, these factors, some of which act on the whole population, undergo century-wide variations. Gini believes in a form of senescence. Yule also holds that voluntary limitation of procreation is not the only nor even the principal cause of a diminution in the birth-rate; biological factors are more important. These may be connected with density of population, mode of life, diet or physical exercise. As an hereditary factor, the tendency to low fecundity seems to predominate over the tendency to high fecundity; the reduction in the birth-rate would thus arise from a biological selection as well as from a social selection.¹

On the other hand, as regards economic and psychological factors, *the limitation of families* by birth-control methods,² by abortion, by infanticide or exposure of infants has been practised by all peoples and at all periods; the Greeks, Romans, Germans

¹ On the basis of animal observation, experimentation and statistics, it has been claimed that the increase of a whole population is controlled by a mathematical law. However, such a formula neglects the economic and psychological factors. Again, a nation is an artificial unit formed by groups which do not evolve in an identical manner: there are the countrymen and townsmen, the different social classes, the inhabitants of each natural or economic region of the country. How can one formula apply to the whole of these different groups?

² Contraceptive appliances are recent. Simpler, but less satisfactory or less certain birth-control methods have been used at all times and by all peoples, without mentioning late marriages and celibacy. Moheau, writing of France in 1778, said: "It is not only among the rich that women regard the propagation of the human race as a time-worn trick, these fatal secrets have already spread to the country-side. Nature is fooled even in the villages."

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and Chinese, all had recourse to it. Although infanticide and abandonment of infants has become rarer, abortion is remarkably common—in the large towns, at any rate, there are probably as many abortions as births,¹ and anticonceptual procedures of various kinds are very widespread.

Is the limitation of births contrary to moral principles in general, to Roman Catholic teaching in particular?

The Rev. Father Valentin Fallon, of the Society of Jesus, writes as follows :

Does morality make it a duty to multiply, thoughtlessly and without limit, the population of a country, in spite of the prospect of poverty, famine, infirmity, debility and degeneration which would result? Does it make it a duty for the married to bring into the world indiscriminately, children for whose necessities they are incapable of providing?

By no means. Morality says: "If you are not in a position to fulfil the duties and bear the expenses of marriage in a proper manner, remain continent." It says to the married: "Use marriage with moderation. Have consideration for your wife's health, for your own health and for the welfare of those to whom you give birth. Continence can be practised in marriage."

Differences of opinion are confined to the methods of birth-control when such restriction is recognised as necessary, either for biological or economic reasons concerning a family, or for reasons of general interest—an excess of population resulting in poverty or leading to war. While the Catholic Church condemns every other method than continence—and many countries have passed to this effect laws the application of which is illusory, at least as regards the richer portion of the population—the neo-Malthusians, supported by certain dignitaries of the Protestant

¹ It has been estimated that the number of abortions practised every year in the United States is two millions, in Germany one million, in France 600,000. The number of legal proceedings is insignificant, and in this domain repression has had no more effect than religious and moral prescriptions.

The majority of women who practise abortion live by an occupation which is incompatible with maternity, or else they are mothers, already overworked, who fear the increase of poverty which would result from the arrival of another child. Compelled to clandestine intervention, they risk mutilation and death. This grave problem must be approached frankly and with courage.

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Churches, by leaders of the medical profession and by statesmen¹ countenance the employment of mechanical or chemical contraceptive methods, which are explained frankly in the Birth-Control Clinics established in Holland, in the Anglo-Saxon, Germanic and Scandinavian countries, in Switzerland, Hungary, Poland, Soviet Russia, India, Japan and Mexico. The essential argument of the neo-Malthusians is that, since the well-to-do classes make use of these procedures it is both inhuman and contrary to the public interest to condemn less fortunate families to multiply out of all proportion to their resources, regardless of the health of the mother and of children already born. Besides, they remark, as soon as we recognise that it is necessary in certain cases, for eugenic, medical or economic reasons, to advise parents to limit or lessen the frequency of their offspring, we cannot refuse them the means of doing so, if they declare themselves incapable of relying upon continence alone, the observation of which requires agreement between the man and woman, and may be neither favourable to their health nor to the stability of their marriage. For the eugenists who maintain the superiority of the hereditary endowment of certain classes, it is the only method by which this "differential birth-rate", which multiplies the inferior elements of the population more rapidly than the better elements, can be avoided. Lastly, is not voluntary procreation preferable to abortion? The birth-control clinics, to avoid being charged of encouraging moral laxity among young women, only receive pregnant women and married women. But their instruction inevitably extends beyond their clientele.

In reality, with or without special clinics, the knowledge of modern contraceptive methods, when once implanted in certain circles, cannot fail to reach everyone.²

¹ Lord Buckmaster, a former Lord Chancellor of England, wrote: "To regulate and control birth is not to degrade, it is to elevate human nature. It is not to weaken, it is to intensify all family affection."

² In London, out of 229 women who did not desire children 18 per cent. practised continence, 82 per cent. used contraceptive measures (Dickinson and Beam). Out of 4,166 white women observed in the United States, 45 per cent. used contraceptive measures (33 per cent. in the poorer class, 39 per cent. in those of moderate means, 51 per cent. in the middle class and 78 per cent. in the independent class). The majority of these had already had one or more children. The

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These methods have been accused of producing local lesions, but they are surely less serious than the results of abortion which many women practice when they have been unable to prevent conception.

We need not dwell upon the religious or moral objections which may be raised against contraceptive measures. Some people hold that they encourage immorality and that the widespread diffusion of contraceptive methods tends to an excessive restriction of births. Let us compare from this view-point two neighbouring nations presenting great resemblances; Holland where instruction of these methods is legal and has been practised openly for thirty years at least, and Belgium which prohibits it; Holland has a birth-rate one-fourth higher than that of Belgium; from 1901 to 1929, the birth-rate diminished by 35 per cent. in Belgium, by 28 per cent. only in Holland, and no one can say that morals are more lax in Holland than in Belgium.

Trusting to instinct or fatalism is certainly not advisable either for families or for nations. Nations should strive to attain an optimum population as regards number, quality, geographical and occupational distribution and proportion in age. Parents should determine the number of children they wish to have and the time when their birth is desirable. The child should be desired. This imposes sacrifices, but it gives the union of man and woman, and life in general, a fuller and higher meaning, which nothing can replace. When procreation will be mostly deliberate, large families will form an *élite*, both from the physical and the spiritual point of view.¹

frequency of conception was the same in all social classes among women who did not employ contraceptive methods. The latter, according to the intelligence with which they were applied, reduced the number of conceptions by 35 to 57 per cent (Raymond Pearl).

¹ At the present time, too many large families owe their prolificness to alcoholism, tuberculosis or carelessness. In these cases the infant mortality is often higher than the average. In France, in 1850, official premiums were offered to working-class families with the smallest numbers of children. The indiscriminate encouragement of "repopulation" in town and country, in tainted families as well as healthy, is an error from the eugenic, economic, social and moral point of view. The maintenance, at the expense of the community, of numerous families of the poorer classes ends in diminishing the fertility of the independent class, owing to increased taxation. To mention an ex-

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In countries regarded as the most civilised, births are less numerous, but the proportion of infants who survive is higher; the family and society consequently gain, and the condition of women is improved. We can foresee the possibility of a planned demography, the counterpart of planned economy (Stouman).

The problems of population are extremely complex and delicate, as they affect religion, morality, politics, economics, as well as biology, psychology and sociology. They cannot be considered from one point of view only. Their obscurities and uncertainties remain numerous, and we are only beginning to approach them objectively.¹ The recent creation of an International Union and of national committees for the scientific study of the problems of population cannot fail to throw new light on this subject.

ample, taken from Laski: from 1912 to 1932 an unemployed workman and his wife had no other resources than subsidies from the public purse; four children were born during these twenty years; the maintenance of this family cost the London taxpayers £1,819.

¹ In this respect the reports of the English National Birth-rate Commission are unrivalled (1916-25). Also, the Women's Co-operative Guild has published a volume of letters, *Maternity*, in which women of humble position describe in poignant terms the sufferings inflicted upon them by the raising of more children than they could afford for reasons of health or material resources.

CHAPTER IX

OCCUPATIONAL FACTORS

ENGLAND has produced the most complete and reliable statistics relating to *occupational mortality*. They include the whole male population between the ages of 20 to 65 years. In each occupation various groups are considered separately: the owners, employers, agents and managers—the subordinate superintending staff, including inspectors and foremen—finally the various categories of workers, whose occupational risks are often unequal; for example, in the cotton industry, the weavers have a mortality of 104·8, the doublers, winders, warpers, beamers of 123·6, the spinners and piecers 124·8, the strippers and grinders 139·6, the skilled blow-room operatives 151·6, the card and frame-tenters 160·1, the average for the male English population between the ages of 20 and 65 years being represented by 100.

On the basis of the most recent English statistics, for the years 1921, 1922 and 1923, we may divide occupations into four groups, as regards mortality. The first group, with a mortality below 80 per cent. of the average, includes agricultural occupations, and outdoor domestic servants, the farm-bailiffs and agricultural foremen having the lowest mortality of any occupation (52·6 per cent. of the average).¹

Next come the salaried professional occupations: clergymen, teachers, persons employed in public administration, bank and insurance officials, civil engineers and surveyors, railway officials and employees (with the exception of clerks, shunters, pointsmen

¹ This is below that of the farmers themselves (67·4), this last class including some people in very modest circumstances, and others of indifferent or even bad health, whereas no one would be selected as a foreman if he failed on grounds of physique.

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and level-crossing men), finally the workers in the healthiest industries: cement works, paper mills, and grain mills.

In the second group, in which the death-rate varies from 80 to 110 per cent. of the average, we find the healthy occupations: iron and steel workers (not puddlers), smiths (including copper, tin, gold and silver smiths), fitters, boiler-makers, plumbers, gas-fitters, leather and rubber workers, weavers, soap-makers, electrical fitters, makers of watches, clocks, scientific and electrical instruments, tailors, boot and shoemakers, bakers, pastry-cooks, cabinet makers, sawyers, upholsterers, printers, photographers, bookbinders—the open-air occupations: quarriers, brick-makers, carpenters, bricklayers, plasterers, slaters, tilers, platelayers, painters and decorators, riveters, shipwrights, omnibus and tramway drivers and conductors, drivers of motor vehicles, grooms and horsekeepers, railway shunters, pointsmen and level-crossing men, railway porters and lampmen—the managers and proprietors of wholesale or retail businesses, salesmen, shop assistants, clerks, draughtsmen, storekeepers, packers, commercial travellers, insurance agents, auctioneers, domestic servants (indoor)—the non-salaried professions: lawyers, doctors, dentists, architects, music teachers, authors, journalists, artists.

The death-rate of the third group is definitely above the normal: 110 to 160 per cent. of the average. It includes the industries requiring considerable physical effort and fraught with the danger of damp, heat, dust or alcohol: miners,¹ glass-workers, puddlers, metal moulders, brassfoundry furnace men and labourers, cutlers, metal polishers, masons, stone-cutters and dressers, shipyard labourers, hat-makers, dyers, tobacco-factory operatives, french-polishers, brush-makers, wool and cotton operatives (not weavers), brewers, chimney-sweeps, bargemen, dock labourers, drivers of horse-drawn vehicles, inn- and hotel-keepers, waiters. This group includes also the casually paid occupations, which often are the refuge of people

¹ The "hewers" and "getters" have a death-rate of 93·8 per cent. only, as they are the more robust among the miners, men from 25 to 45 years of age. The iron-ore miners have a death-rate of 95·4 per cent.

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more or less deficient in health (hairdressers, messengers, porters, actors, musicians).

The fourth group has a very high death-rate (more than 160 per cent. of the average). It includes seamen (merchant service), exposed to serious accidents and to contagion from tuberculosis, venereal and tropical diseases (176·8 per cent.)—the low-paid and casual occupations, when they expose to the effects of cold weather and to alcoholic habits (costermongers, hawkers, streetsellers, 166 per cent.)—the sedentary occupations leading to a high consumption of alcohol (barmen 195·5 per cent.)—finally the occupations in which silica dust is inhaled; potters (164·2 per cent.), earthenware and china kiln and oven men (183 per cent.), file-cutters (185·1 per cent.), metal grinders (197·7 per cent.), tin and copper-miners (326·8 per cent.). In the two last occupations, certain kinds of work are connected with even more dangerous hazards: the grinders in the cutlery trade have a death-rate of 329·5, the underground workers in the tin and copper mines of 433·5 per cent. of the average.

Occupational mortality thus varies from 53 to 433 per cent. of the average, or 1 to 8.

In each kind of occupation the mortality increases from the executive staff to the overseers and foremen, from them to the skilled workers, and from these again to the daily labourers. The influence of higher wages, or at any rate of more regular payment, is shown in the difference between the mortality of railway porters (102·3 per cent. of the average) and that of porters in general (149·2 per cent.); between that of the drivers of motor or steam vehicles (86·2 per cent.) and that of the drivers of horse vehicles (132·8 per cent.); between that of the skilled workmen (93·4 per cent.) and that of the unskilled of the naval dockyards (135·1 per cent.); between that of the teaching profession in general (73·6 per cent.) and that of music teachers (109·6 per cent.); probably also between that of the Anglican clergy (56·1 per cent.), of the Catholic clergy (78 per cent.), and that of the ministers of other religious bodies (63·9 per cent.).

It is somewhat surprising to observe the difference revealed between the mortality of the Anglican clergy (56·1) and that of the teaching profession (73·6) the great majority of which is

formed by schoolmasters. Yet, they resemble each other in many respects, in their recruiting, in their economic status, in the intellectual and moral character of their work, and in the dignity and regularity of their life; both are for the most part married and the fathers of families; both are equally distributed in town and country. The difference is partly explained by a high mortality among teachers aged 16 to 25 years, which probably indicates that youths of poor physique are attracted to this as a light and healthy occupation.

Occupational morbidity, an excellent account of which has been given by Teleky, is, on the whole, parallel to occupational mortality. But, as we have already remarked, the most common affections are not fatal diseases. In the working class, as in the population in general, affections of the upper and lower respiratory passages and of the digestive system, rheumatism, nervous and cutaneous affections, and in women, uterine disorders (especially dysmenorrhœa), predominate. It must be noted that tuberculosis is not only more frequent, but also develops earlier in the working class. While in England, for 1,000 persons of each age-group, the mortality from tuberculosis reaches its maximum between 55 and 65 years in the general population, in the working class its maximum is between 25 and 35 years.

The state of *fitness* of the working class is shown in a striking manner by the medical examination of 2,425,184 English conscripts between the ages of 18 and 42 (1915-18). These were divided into four groups.¹

Group I: Men fit for all branches of military service.

Group II: Men fit for certain branches only.

Group III: Men fit for sedentary service only.

Group IV: Men unfit for any military service.

In the first group the health was nearly perfect, in the second group it was satisfactory, in the third group mediocre and in the fourth group bad.

¹ This does not take into account the medical examination of two million volunteers who joined up in the first period of the war, as they were not examined in a systematic manner. It follows that the statistics relating to the conscripts is no doubt less favourable than the examination of the whole male population of military age would have indicated.

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In the non-industrial areas the classification of recruits was as follows :

Group	I :	70 per cent.
"	II :	20 "
"	III :	7.5 "
"	IV :	2.5 "

Or 90 per cent. of men in sound health and 10 per cent. defective. On the other hand, in the industrial centres the figures were :

Group	I :	19 per cent.
"	II :	27 "
"	III :	41 "
"	IV :	13 "

Or 46 per cent. of sound health and 54 per cent. defective. Certain occupations even gave the following proportions :

Group	I :	27 per cent.
"	II :	15 "
"	III :	16 "
"	IV :	42 "

Or 42 per cent. sound and 58 per cent. defective, of which three-quarters were so defective in physique that they were not even judged fit for sedentary work. In civil life these defectives subsisted as best they could; unemployed when they reached the limit of their resistance, then attempting to perform work beyond their strength. The wages of the wife and children, with public and private assistance, completed their meagre resources. Disease created their poverty, their poverty aggravated the disease.

Occupational risk is therefore very variable, and of greater importance than is often recognised.

It depends upon two kinds of factors : one relating to the life of the worker in his place of work, i.e. the conditions and risks of work ; the others relating to his life outside, i.e. his lodging, his wages, his hygienic conditions, the medical attention he receives, his education, the duration and utilisation of his leisure.

Morbid conditions due to the nature of the work may present a specific character, easily recognised ; these are technopathies, that is occupational accidents and diseases.

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On the other hand, the conditions of work, and also the life of the worker outside his place of work, according as this is determined by his occupation, produce affections to which the whole population is liable (anæmia, tuberculosis, arteriosclerosis, rheumatism, etc.). The occupational origin of these affections can only be established by the frequency of their appearance in a certain occupation. Statistics do not distinguish between occupational mortality proper, and mortality caused by what may be called the occupational atmosphere. As the Registrar-General of England remarks, in order to estimate the direct occupational risk entailed, it would be necessary to tabulate the mortality of married women according to the occupations of their husbands. If this were done, we should, for the first time, obtain a measure of the indirect effect of occupation upon mortality.

It is also necessary to take into account the principles on which occupations are chosen. Those which do not require much physical strength attract the unhealthy, the weak and the infirm.

Lastly, the effects of the occupation sometimes act indirectly on the health of the children. They also suffer directly if they are employed at too young an age, if the work is out of proportion to their strength, and if it is performed under unfavourable conditions.

In spite of much improvement, mortality and morbidity remain higher in industrial workers than in the general population. This high mortality is due, firstly, to accidents, secondly, to tuberculosis and pneumonia, the fundamental causes of which are insufficiency of ventilation and monotony of the work.

From a report written by Sir John Simon sixty years earlier, Sir George Newman quotes that

the artisan's indoor employment being essentially dull, sedentary, monotonous and tiring, his occupation gives him a heightened liability to tubercular disease. [And he adds :] I have no doubt that these causes, mitigated indeed but not removed by the general reduction of hours of labour, are still largely operative, and recent physiological research has made the mechanism of the process intelligible. Flack has pointed out how conditions of nervous

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stress react upon the physiological efficiency of the cardiovascular mechanisms, and thus impair the physique and health of the individual, and Professor Dreyer and his collaborators, confirming and extending results reached long ago by Hutchinson, have shown that a failure of these mechanisms may be an important contributory cause of successful invasion of the tubercle bacillus.

Industry in its present form produces mental depression, anxiety and a feeling of inferiority which create, complicate and prolong disease and invalidism.

Social medicine has a threefold mission in the occupational domain: (a) to avoid accidents; (b) to prevent occupational diseases; (c) to improve the conditions of work.¹

It is also necessary to improve the conditions of life apart from work, but this concerns domestic, economic, sanitary and educational factors which we shall consider in special chapters.

Occupational accidents overtake every year more than 1 out of 10 workers; they are fatal in 0.3 per cent. of the cases (2 to 3 deaths per 10,000 workers) and they cause permanent invalidity, total or partial, in 2 to 3 per cent. The annual loss which they cause, in the United States, is estimated at 5,000 million dollars. The number of fatal accidents has been reduced in certain industries, in mines for example. On the whole, however, it has not diminished during the last twenty years (except through unemployment). The progress realised in prevention is being neutralised by the introduction of fresh risks.

In seeking for the causes which lead to accidents, it has been attempted to distinguish between the fault of the employer, the fault of the worker, and fortuitous circumstances. This is most often an arbitrary classification. As Loriga remarks:

The traumatic accident may appear to be the prototype of affections resulting from direct and well-defined pathogenic factors. In fact, it has long been believed that traumatic agents (machines, tools, mechanical contrivances, fire, electricity) constituted the determining cause of a very high percentage of accidents. It has also been believed that man often helped to cause the accident by

¹ We are dealing especially with industrial work, but agricultural and office work must not be neglected from this point of view.

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his ignorance or negligence. But it is recognised that the technical improvement of appliances and the mechanical protection of certain dangerous parts of machines only succeeds in reducing the number of accidents in a slight degree. A more careful study of their causes has shown that there is a large number of conditions which, independently of traumatic shock, intervene in the origin of accidents, and that these conditions, which are very variable, are added one to another or combined. Sometimes it is the duration and intensity of the work which predominates, sometimes the distribution of the daily or weekly periods of activity and rest, acceleration of the rhythm of the work, excessive or irregular efforts, day or night work, etc. Sometimes, on the other hand, we have to accuse the environment in which the work is done : extremes of temperature, excessive humidity, pollution of the air by dust or gas, insufficient or badly arranged light, deafening noises, lack of space, etc. Sometimes also individual factors (carelessness, drunkenness) play a part, but a less important one.

To sum up : from 20 to 25 per cent. of accidents depend on the machines and implements, ineffectiveness of preventive technical measures or fortuitous and unavoidable causes (fall of materials, giving way, boiler explosions, injuries produced by animals, etc.). All other accidents (75 to 80 per cent.) arise from causes which act through the medium of man himself, by reducing the resistance of the organism in relation to the quantity and quality of the operations it is expected to perform. These lower his muscular power or attention, and slow down his reactions ; in fact, they provoke weakness, torpor or apathy, and consequently inability to meet danger by prompt and effective resistance. For this reason, prevention can depend only to a slight degree upon technical or mechanical measures ; on the other hand, it can be effected in a much greater measure by protecting the worker against all the causes of unhealthiness in work, i.e. against agents which are generally considered as liable to cause only common ailments.

In the personnel of every trade about 25 per cent. of workers are subject to repeated accidents, which means that they are either ill adapted to their work or naturally careless. Such "accident prone" workers ought to be removed from dangerous posts (Farmer).

The prevention of occupational accidents, generally undertaken by individual employers or by employers' associations constituted for this object, is based on the following programme :

1. Elimination of the mechanical causes of accidents by disencumbrance of workshops, improvement in lighting, applica-

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tion of protective devices to machines, and regular inspection of boilers, belts, cranes, conveyances, pit-cages, electric-light installations, fire-preventing devices, etc. ;

2. Occupational guidance, training and selection ;

3. Improvement in the physiological and psychological conditions of work, and measures to counteract the fatigue and monotony of work.

4. Improvement of the conditions of life outside the factory ;

5. Instruction of the personnel in the measures for avoiding accidents.

6. Inculcating in the worker the habit of precaution ; initiation of new hands into the dangers of their work by means of pamphlets and lectures illustrated by lantern slides ; creation of a " safety sense " by means of instructive placards and illustrated posters ; formation of " safety delegates " and " safety committees " which open an inquiry after every accident and draw the attention of the whole personnel to the necessary precautions.

In fact, the prevention of occupational accidents is of a psychological rather than a mechanical order. The " Safety movement " in certain industries has succeeded in reducing the number of accidents by half, or even three-quarters. The method used was to interest the workers in investigating the causes of accidents, and to teach them how to protect themselves.¹

This evolution is well shown in the industrial safety museums ; by the side of mechanical safety contrivances, an increasingly larger space is devoted to the education of managers, foremen and workers.

What we have said of accidents also applies to *occupational diseases*. These originate in the following ways :

(a) From physical causes : atmospheric pressure, noise, light, electricity, radiation, heat, humidity ;

(b) From mechanical causes : dust ;

(c) From chemical causes : phosphorus, mercury, lead, arsenic, sulphur, carbon monoxide, carbonic acid, various organic compounds, etc. ;

¹ The International Labour Office has formed an international committee for the study of the prevention of occupational accidents.

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(d) From organic causes : micro-organisms, parasites ;

(e) From physiological-pathological causes : fatigue, faulty postures, strain.

The history of occupational hygiene shows that none of these causes is beyond the resources of technique. White phosphorus has been replaced by red phosphorus, white lead by white zinc ; work in caissons has been almost completely robbed of its danger, by the use of safety devices and careful decompression of the workers ; dust has been absorbed by means of aspirators ; hookworm has been eliminated by inspection of the workers when taken on. Many unhealthy occupations have been rendered healthy. Silicosis, however, still causes severe ravages.

Constant vigilance is necessary, for at each new danger created by a change of technique there is the same inertia on the part of employers and workmen ; the phosphorus necrosis which attacked the jaws of match-makers had hardly been eliminated when there appeared the slow, painful and fatal poisoning of workers using radium salts to render watch dials luminous.¹

It is paradoxical that obligatory compensation for occupational accidents and diseases has not resulted, as regards its immediate effect, in promoting the use of preventive measures against the causes of these accidents and diseases. Employers have preferred to pay the insurance premiums for certain risks rather than endeavour to diminish them.

In the long run, however, humanity and material considerations prevail, and employers as well as trades unions demand the aid of occupational medicine in reducing the tribute paid by industry to disease and accident.²

Compensation for injury caused by specific occupational diseases is enforced by law in many countries. This is not

¹ Numerous treatises on occupational diseases are available. The International Labour Office has opened up a new line and rendered great service in publishing, under the direction of Professor Carozzi, an international encyclopædia, *Occupation and Health*, due to the organised collaboration of specialists from many countries.

² It is interesting to compare, in this respect, the opening of the St. Gothard tunnel (1882), which cost thousands of lives, with that of the Simplon tunnel (1906), in which the death-roll was less than 100. In this case all precautions had been taken for the safety, health and comfort of the workmen.

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only a measure of humanity but also a means of encouraging the study, detection and prevention of these diseases, which in the absence of a special rate of compensation, remain too often ignored. It is also necessary to keep a regular list of the sick and absent, as is done in certain important industries. This is the only way to detect an abnormally high rate of unspecified occupational affections.

Improvement of the conditions of work is feasible in many directions.

Industrial hygiene is still ignored in many industries, especially in small workshops, in tailor's and dressmaker's establishments, in pastry shops and restaurants and in many offices, but it has inspired the modern factories, carefully built and run (some of them with artistic decorations, flower-decked halls, terraces, roof-gardens, and sports grounds) and provided with faultless sanitary arrangements, lavatories, shower-baths, canteens, rest-rooms and libraries.

Cleanliness, formerly neglected to such a degree that an English employer of industry said he felt his hair stand on end when he was advised to have his factories swept once a week, is no longer considered an unreasonable claim.

As regards *illumination*, enough daylight is provided in the majority of trades, and artificial light has been studied extensively. There is, however, still much to be done, since not long ago an English investigation revealed that in one-tenth of the total number of factories, the darkness was such that the investigators could hardly help stumbling on the stairs. Yet, the employer is obviously interested in the matter; defective lighting may diminish the quality and the quantity of output by 35 per cent., and also increase the number of accidents. It is even more astonishing to see in banks, hotels, large stores and public buildings, so many rooms where work is only possible in artificial light. In industries where its use is unavoidable (underground railways, etc.), a periodic change to work performed in daylight would be useful.

The science of illumination has its research laboratories, its associations, its journals and its handbooks.

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Heating is closely allied to ventilation and also to the regulation of humidity in the air of workshops. Central heating and conditioned air are becoming increasingly widespread.

The conception of ventilation problems has been completely altered by recent research. Formerly regarded as a question of cubic feet of air and of the percentage of carbonic acid gas, i.e. as a chemical problem of pulmonary gaseous exchanges, it is now considered as a physical problem; the aim is to cool the skin by the circulation of suitably fresh and dry air, thus allowing the normal temperature of the body to be maintained by the evaporation of sweat.

A confined atmosphere rarely contains sufficient carbonic acid gas to be harmful to the organism; it is the stagnation, moisture and overheating of air which renders it depressing, harmful, and in extreme cases fatal.

An instrument invented by Professor Leonard Hill, of London, the catathermometer, enables us to determine the stimulating or depressing properties of the air; while the indications of the thermometer are often contrary to our sensations, those of the catathermometer express them exactly.

By thus estimating the quality of the air in workshops, Vernon has shown that good ventilation may increase the output by 12 per cent.¹ In the open air the output of the same workers varied sometimes by 40 per cent., according to the atmospheric conditions.

Overwork, a few years ago, was one of the principal causes of physical and moral deterioration in the working class. The successive introduction of the Sunday rest, of the week-end rest, of an eight-hour day,² and of workmen's holidays³ have limited the effects of overwork to those who are not legally protected (hotel industry, domestic service, home work, agri-

¹ The common cold causes 20 per cent. of absences. It can often be avoided by proper heating and ventilation.

² This has reduced the number of accidents and increased the hourly output, sometimes the daily output.

³ These are of considerable importance from the health point of view; after a week's holiday only, an average gain of two pounds in weight has been noted; it was not lost a month after resuming work (Munro).

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culture and marine occupations), to those who perform excessive supplementary work, either in factory or outside it, and to those whose occupation is incompatible with their state of health.¹

Further reduction of the hours of work may be necessary, either in certain fatiguing or dangerous occupations, or as compensation for an acceleration of the rhythm of work, or to reduce unemployment. A leading manufacturer, Lord Leverhulme, several years ago, advocated a six-hour day, in the interest of the manufacturers themselves.

The study of fatigue should be undertaken in all occupations. Through the observation of occupational movements by means of photography and cinematography, many ineffective movements handed down by tradition can be eliminated. As an efficiency engineer, Frank B. Gilbreth, has pointed out, there is only one good way to do a job, that which experience has shown to be the best. Movement in itself is not the only cause of fatigue; it is necessary to choose the most suitable rhythm, to limit the duration of work, to determine the optimum weight and position of objects to be lifted or manipulated; to adopt the most favourable position of the body. The workman should be provided with a comfortable seat and be given the opportunity of changing from sitting to standing; also he should be suitably clothed. The ventilation, lighting, heating and cleanliness of a factory, its hygienic arrangements and social service, its administration and its spirit, and lastly, the rate of wages, and the conditions of life outside, also play a part in the production of fatigue and in the means of avoiding it.

Unfortunately, we do not yet possess a certain and easily applied test which will demonstrate and measure individual fatigue or the fatigue of a group of workers (Dhers).

Fatigue is diminished if short periods of rest are interposed. The "continuous working day", including half an hour or an hour's interval for light refreshment, seems preferable to the cessation of work between noon and two o'clock. Under

¹ Certain occupations remain exhausting; at the age of 40 a fireman, and at the age of 50 a driver can no longer be employed on the engines of fast trains. Ten years in the shoe department of a large store exhaust the girls employed.

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these conditions the output of a six-hour day approximates to that of an eight-hour day. The advantages of this system for the worker are evident, for he avoids the necessity of taking an expensive meal at a restaurant or canteen, or of hurrying home and back in crowded vehicles in order to snatch a hasty meal with his family. Having more leisure at their disposal, the personnel may find a healthy and pleasant dwelling in the suburbs.¹

Night work is always less productive and more fatiguing than day work, and causes more accidents. Unfortunately it cannot be altogether eliminated. Here again alternation of day and night work is necessary.

Home work, which is sometimes prejudicial to the health of the customer,² is associated with a high mortality and morbidity, because it is chiefly undertaken by the feeble and incompetent, because it involves overwork for the whole family and often renders the dwelling unhealthy, because, tending to exploitation and arbitrariness, it escapes the control of that form of public opinion constituted by the personnel of a workshop, lastly, because it is antagonistic to the grouping of those concerned and to the application of protective legislation.

Under the influence of Consumers' Leagues, the first of which was formed in New York in 1889, more favourable conditions have been granted to home workers³; they have obtained a legal guarantee of protection and of a minimum wage.

Woman labour, especially that performed by mothers, has gravely affected the health of industrial populations. In some regions nearly half the women are or have been wage-earners, although their occupational career does not usually exceed ten years. Three-quarters of them do unskilled work.

¹ The continuous working day must not be allowed to give the worker the opportunity of accepting supplementary work elsewhere, this would cause a return of overwork and would also lead to unemployment by allowing overlapping.

² Clothing, toys and sweets may transmit tuberculosis, diphtheria, etc. An epidemic which arose in a camp of the American army at the time of the war with Spain originated from an infected home worker.

³ Especially by the use of labels indicating that the object for sale has been manufactured under healthy and humane conditions.

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From inquiries conducted in Europe and in America concerning the women employed in industry, especially in the textile industry, it appears that the mortality and morbidity among them is higher than among men (as regards number and duration of diseases), while the contrary is the case in other women of the same age. The incidence of occupational intoxications and accidents is higher in women than in men.

On the other hand, when the mother works away from home, fertility is diminished, abortions are more frequent, the percentage of abnormal labour is higher, mortality at birth and infant mortality are increased, and the length and weight of the new-born are reduced.

It may be objected that under this occupational factor is hidden an economic factor, that mothers who go out to work are poorer than others. An inquiry undertaken at Baltimore,¹ however, shows that even in a group with uniform resources, the outdoor work of the mother has a marked influence on the health of the child.

Another inquiry by the Children's Bureau proves that in very many cases the working mother bears almost the whole of the double burden of industrial and domestic work. Very few endure this without damage to their own health and that of their children, whose education, and sometimes morals, are neglected for want of supervision (Wright).

Moreover, indirect proofs abound: infant mortality in Lancashire was at its lowest point during the unemployment due to the siege of Paris; the same observation was made during strikes, which kept the women at home. In Belgium, the stoppage of industry during the war led to a diminution in infant mortality which only arose again under the influence of the food-shortage. Lastly, it has been shown that puerperal mortality diminishes when industry is idle (Geddes).

These facts do not condemn women's work, but only the conditions under which it is still too often done. By means of a shorter working day, proper occupational hygiene, sufficient wages, healthy dwellings, labour-saving devices for domestic duties, good day nurseries and nursery schools, the employment

¹ See Chapter VII.

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of women causes no injury to their health or to that of their children. It may be necessary for the family on economic grounds ; it may be indispensable for reasons of national economy.

Does not the farmer's wife work, and do we not realise better every day that life is neither so full nor so happy without the discipline of a regular occupation and the social relations which it provides ? Whether the mother works outside the home or not, the child will be better cared for, and its physical and mental development will be better assured if it is taken to a day nursery and later to a nursery school managed on modern principles. But under these conditions, and with the simplification in house-work produced by modern conveniences, the woman who does not work will remain to a certain extent idle ; a state of affairs found in certain working-class communities.

In any case, as in the Soviet Republic, the mother should receive leave pay during the two months preceding parturition and the two months following it.¹ She should be given every facility to suckle her infant ; attendance at prenatal and infant clinics should be made compulsory, and, as in the United States, pensions should be granted to mothers destitute of resources, owing to the death, desertion, sickness or invalidity of the father of the family. The system of family wages² in force in France, Belgium and Italy should be made general.

With regard to *child labour*, it has long been known that the height of adolescents employed in industry is lower than the average for the same age. Loriga has shown that this holds good even when comparing working and non-working juveniles living under the same economic and social conditions.

The mortality and morbidity of these adolescents is doubled

¹ The National Institute for Maternity and Child Welfare in Italy provides the mother with an allowance of 160 lire and leave pay for two months. It has created a considerable number of maternity canteens, maternity homes, day nurseries, etc. It has in an exemplary manner co-ordinated and developed maternity and child welfare in Italy.

² A supplement to the wages, which is not proportional to the number of children, but is higher for the second child than for the first, etc. It is paid from a fund to which all employers contribute according to the total sum they pay in wages, so as to discourage employers from hiring childless workers in preference to others with a view to paying less in family wages.

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between the ages of 14 and 15 years, although the greater frequency of diseases is manifested chiefly some years after the commencing of work. Growth is less rapid in child workers than in school children; the pulmonary capacity and muscular strength also develop less rapidly in the former than in the latter; menstruation appears later; the proportion of delinquents is greater; the child who returns to school after a period of labour is slower in learning. The industrialisation of a population is accompanied by an increase of adolescent mortality.

Sir George Newman sums up in five propositions what we know on the subject of child labour. Many enter industry too soon; the health of these children, at first sight, appears to undergo no injury; this appears gradually and slowly, but it is grave and irremediable; the physical damage is accompanied by retarded intellectual development; it is not the labour itself, but the conditions of industrial work which have a harmful effect: too long hours of work, want of sleep, hasty and insufficient meals eaten at irregular hours, lack of ventilation of workshops, prolonged standing, etc.

The age of entry of children into industry should therefore be raised to 15 or even 16 years. This would allow them to attend secondary schools, an eminently desirable reform from the civic and social point of view, and one towards which progressive countries are turning.

It is also advisable to encourage occupational guidance, to render obligatory a medical certificate of fitness for work (bearing on the precise occupation which the child is to undertake), and to organise the sanitary and social protection of apprentices.¹

To obtain satisfactory conditions of work for the personnel, industries should possess a certain number of specialised services, the action of which favours the interests of the employers as well as those of the workers. By avoiding losses, which are often considerable, and by increasing the output, these would form an integral part of a rational organisation.

¹ We shall deal later (Chapter XI) with the questions of wages and unemployment.

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The *safety service* prescribes the necessary precautions against accidents, undertakes the instruction of the personnel in safety and organises the participation of the workers in the measures which protect them.

The *medical service* supervises industrial hygiene, carries out systematic examination of the new workmen and employees (which ought to be repeated when they are transferred to another job), attends the sick and injured,¹ registers the absences due to sickness and investigates their causes, undertakes measures to reduce fatigue (especially by the analysis of occupational movements) and studies from life the problems of industrial medicine. Such a service reduces to a minimum the losses due to sickness, accident and lack of adaptation of the worker to his task. While the National Cash Register Company devotes 76,000 dollars a year to this service, it estimates that it is repaid 120,000. Howell Chaney, a great American manufacturer, calculates that sickness of the personnel costs yearly 60 dollars per head to the employer, and 65 dollars to the wage-earner. According to Dr. Collis, the general adoption of the medical service in industry would lead to a yearly economy of 140 million pounds in England.

Given a sufficient number of doctors, nurses and specialists in industrial psychology, it is possible to give yearly to each member of the staff a preventive medical examination, which constitutes the most complete guarantee for health.

With the personnel service and the education service, the medical service co-operates in organising occupational guidance.²

¹ A specialised surgical service diminishes by half the average duration of invalidity due to accidents. On the other hand, by relieving the depressed and reassuring the anxious, psychotherapy has reduced in the same proportion the number of days lost on account of sickness. Lastly, a medical industrial service spreads hygienic principles and promotes preventive medicine. It may include ambulatory installations, such as the radiological carriage on the Northern railway in France. In the Soviet Republic the number of "posts for the protection of health in industry" reaches many thousands.

² Occupational guidance (already defined in 1575 by Dr. Juan Huarté in his book, *El examen de ingenios para las ciencias*, which appeared in twenty-five editions in Spanish as well as in thirty-six other languages) is the choice of an occupation for the individual. This choice is based

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The medical examination provides, not only negative indications, but also positive suggestions, based on the physiological and psychological study of the subject. It detects and treats the infirmities, diseases and deficiencies disclosed. Thus, "as complementary to the classical hygiene, collective, anonymous and antimicrobial, a new hygiene appears—specific for the physical and moral constitution of the individual" (Martiny).

The *personnel service*, the connection of which with the medical service we have mentioned, is concerned with the selection, distribution and promotion of each member of the staff, and with discipline. It puts an end to the arbitrariness of foremen and purifies the moral atmosphere of the factory by relying upon a scientific system of examination, classification and control which insures for each worker the post for which he is best adapted, and in which he is most likely to progress. By this service, the industry and the worker gain materially as well as morally.

This *occupational selection*, which comprises both medical and psychotechnical examination, has reduced the accidents in aviation by 60 per cent. It has been successfully applied in numerous industries, and has been utilised in the recruiting of omnibus drivers, engine drivers, the police (Stuttgart) and the municipal personnel (Amsterdam). It is a guarantee, as regards accidents, for the public as well as for the employer and the worker. Occupational selection enables posts to be found for the infirm and the weak. It reduces the instability of labour which affects both employer and wage-earner.

The *education service* organises technical education, supervises the progress of the apprentice by psychotechnique, improves the skill of the personnel as a whole and imparts also general education. It fills the gaps, which are still very large, in occupational training. It takes the most varied forms, for example, the instructional carriage of the Orleans railway company.

The *social service* dealing with dressing-rooms, lavatories, shower baths, canteens, drinking water, recreation-rooms,

on the aptitude of the party interested and on the prospects offered by the work. Occupational selection is the inverse operation: the selection of a candidate for a post.

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sports grounds, libraries, cinemas, hostels, gardens, savings banks, loans, insurance and pensions, day nurseries and kindergartens—would seem to be accessible only to the most prosperous industries ; on the contrary, it has often preserved a declining firm from ruin.

When the worker's output was small, owing to bad housing, undernourishment and unhealthy workshops, the introduction of health and welfare services has given him the strength and will-power necessary for his task. This has been the experience of the National Cash Register Company, which has illustrated it by means of a film, for the benefit of others. This is the history of the steel industry in Birmingham (Alabama) ; compromised by the employment of negro convicts and by unfavourable conditions of existence for the employees, it was saved by the introduction of free labourers and by the building of model villages for the working staff.

Social service, when instituted in a naval dockyard, resulted in the driving of 5,000 extra rivets a day, which meant building three more ships a year. Social service in certain industries has reduced the number of accidents by 47 per cent, the number of days lost by 59 per cent., and increased production by 19 per cent. The Health of Munition Workers' Committee in England reported that 25 per cent. of the workers in a factory were badly fed. After the installation of a canteen, the number of days lost diminished by 50 per cent. and the output was greatly increased. From these facts it is not surprising that, in 1931, the potash mines in Alsace spent a sum equal to 32 per cent. of the wages on social services, of which 12 per cent. only was obligatory (Dubreuil).

In England and France this service is entrusted to the Welfare Superintendent, whose duty it is to see that "everyone in the business is satisfied". Trained in a school of social service which imparts general or specialised instruction, and having served a period as a workman, the Welfare Superintendent sometimes directs the personnel as well as the social service ; when a woman, she may also act as a nurse. The position is a delicate one ; he or she must explain to the employer the needs and desires of the workers, understand and serve the

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working class, while remaining loyal to the firm; generally speaking, the Welfare Superintendent urges upon the directors the importance of the human factor in industry. The natural protector of women and child workers, intermediary between the industry and the families, the Welfare Superintendent gives a tone to the factory which is too often wanting.

The organisation which we have just described, utilising special agents and necessitating the establishment of several services, would appear at first sight only applicable to large industries, but smaller establishments can combine in order to create them.

It is important that these services should not institute, or appear to institute, a tutelage. Also, it is preferable to establish and manage them in collaboration with representatives of the personnel. On the other hand, they may be associated with more general services; the sports ground of the factory with that of the town, the education service with the municipal schools, professional schools and university extension, the medical service with the hospitals, the library with the public libraries. In this way the services will attain more elasticity, greater efficiency and better organisation, and will avoid assuming a self-centred character.

The social services of industry commenced through paternalism; they then aimed at the increase of output; they are now assigned the greater mission of supporting co-operation in industry.

Industrial medicine, closely associated with these efforts, has not yet attained the high position which is due to it. Although it has its International Congress and its National Associations, although it is represented by certain journals, and institutes have been founded for its study, it only possesses a fragmentary organisation and plays only an accessory part in industry and in the Faculties. We rarely see medical men pursuing researches in collaboration with the management of industries, workmen's associations and the public services. But this has been done by the "Clinica del Lavoro" of Milan, reviving after two centuries the tradition of Ramazzini. The Soviet Republic also, on a national scale, has introduced medicine in the factory,

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appointed a large number of industrial doctors, and brought the mass of the working classes into touch with the movement for health protection.

Industry has created the risk of accidents and occupational diseases; it has disunited the family; it has uprooted and isolated the worker, entirely dependent on precarious employment and uncertain wages; it has emptied the country-side and overpopulated the towns; it has raised formidable problems which did not present themselves when each family, living on its own ground, produced everything it needed and, in addition, supported its old people, its sick and infirm, its widows and orphans. In this "familial economy" unemployment was unknown, the number of children created no difficulties and the utilisation of leisure solved itself.

But existence was threatened by famines and epidemics, and narrowed to a restricted environment. It is to the scientific and industrial revolution, which began towards the end of the eighteenth century, that we owe the development of transport, of material and intellectual exchanges, of education, hygiene, medicine and welfare.

If many causes have rendered industry harmful to the health, and sometimes even to the morals of a nation, if it has been denounced as a peril and an error of our civilisation, further examination will show that it may be one of the most important elements in the improvement of humanity. The abuse of the industrial system has often debased the race, but it is in the garden cities created by the industrialists that the lowest death-rate and the most favourable conditions of life are to be found.

From the intellectual standpoint, there is no more powerful stimulus, there is no better school than industry when properly understood. As Lord Leverhulme has said, the machine has neither intelligence nor morals, but it develops intelligence and morals in those who use it. Compare the intellectual horizon of the labourer who drives the plough with that of the farmer who manages a tractor. Into what problems is the latter not initiated!

The machine, by granting the same remuneration to the

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adolescent as it does to the adult, by discharging the workman at a comparatively young age, creates difficult and cruel situations. It limits the scope of the artisan, who used to enjoy his work, his independence, his home life. But the machine has also reduced fatigue, and it tends to increase the proportion of skilled to unskilled workmen. It thus raises the level of human labour, and insures a better distribution of talents. This evolution will absorb that part of the population which has still to accept employment inferior to its capacity.

Often performed by routine and directed towards immediate profit, industry has appeared to be a social plague. A working day of thirteen or more hours, repeated 364 times a year, the employment of children of 5 years, sometimes treated brutally to keep them at work, the indescribable misery of the labouring families; perusal of the pages which retrace this history gives rise to a feeling of shame and indignation. But good may come even from excess of evil.

Industry has become at the same time humanised, improved and enriched by the action of employers, the working class and the public authorities.

An *élite* of employers has introduced reforms. Dale, in 1792, said that the more money he shovelled to his workmen, the quicker God made him rich. Robert Owen, in 1816, reduced the working day from twelve to eleven hours among his workmen, and found that the change brought him profit. Those manufacturers who overcome a natural hesitation in increasing their general expenses, recognise that hygienic workshops, a good medical service, dressing-rooms, baths, canteens, workmen's hostels, and sports grounds are remunerative investments. The increase of wages itself repays the industry by leading to greater health and happiness among the personnel, and benefits national economy by the increase in consumption.

On the other hand, labour organisation has in many countries obtained guarantees of a minimum wage for the workers, and various other advantages. By the creation of trade unions, co-operative societies, savings banks, mutual benefit societies, hospitals, dispensaries, night and Sunday schools and workingmen's clubs, the working class has not only improved its material

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position, but has raised itself intellectually and morally, and so prepared itself to take its share of responsibility in the management of industry and public affairs.

Industrial legislation dates from the Edict of Rotari (643) by which masters were compelled to compensate masons who were the victims of occupational accidents, from the Statute of Elizabeth (1563) by which it was the duty of magistrates to fix wages,¹ from the Edict of Philippe II (1579), which established an eight-hour day for miners. Since the first modern industrial law,² the Health and Morals of Apprentices Act (1802), working-class legislation has developed to the point of forming a Labour code, the provisions of which tend to become international, owing to the conventions and recommendations prepared by the International Labour Office³ in the interests of labourers, employees, domestic servants, agricultural labourers, home workers, sailors, women, children and adolescents, emigrants, aliens and natives. These conventions determine the minimum standards concerning the conditions, duration, security and hygiene of labour, weekly rest, night work and wages. They also deal with labour inspection, including medical inspection, social insurance, arbitration and conciliation, and the prevention of unemployment. They aim at organising the worker's leisure. They protect the freedom to organise.

Although their ratification is comparatively slow and industrial legislation in all countries is still incomplete, the solemn proclamation by the Treaty of Versailles, of the principle that "peace can only be founded on the basis of social justice", and that "labour should not be regarded as a commodity", marks the beginning of a new era

In western countries at any rate the condition of the worker has been improved in all respects, although the housing pro-

¹ But its main object was to fix maximum wages.

² This hardly came into force. Modern industrial legislation dates from the middle of the nineteenth century.

³ The way has been paved by the International Association for Labour legislation founded in Paris in 1900. This created an International Bureau at Bâle. Its work is continued by the International Association for Social Progress. Robert Owen and Daniel Le Grand, two manufacturers, are the pioneers of international labour legislation.

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blem¹ and unemployment still weigh heavily upon him. In Asia, Africa and equatorial America, where manufacture is of recent introduction, we witness the evils which characterised the commencement of the industrial period.² However, reforms are beginning to make headway, with the help of international labour conventions.

Further improvement has resulted from the study of manual labour and the organisation of industry. An American engineer, Frederick Winslow Taylor, who had been a working man, introduced in 1900 a system based on rational factory organisation (systematisation), on the reduction of implements, methods and manufactured products to a minimum of types (standardisation),³ and on the concession of premiums to the quickest workers (stimulation). In spite of experiments which were not always successful Taylorism led to a general revision of the principles of industry. The weak points in the current methods became recognised, and also the one-sidedness of Taylor's system which, inspired by the art of the engineer, was physiologically empirical and ignored the social and psychological points of view.

The opposition of the trades unions to the abuse of Taylor's system, the initiative of manufacturers and consulting engineers, and the support of educationists, psychologists, physicians and sociologists, led to a broader method—scientific management,⁴

¹ Except, as regards Europe, in Holland and the Scandinavian countries.

² The diet of 150,000 labourers in Tien-Tsin is so poor that they are subject to xerophthalmia, a deficiency disease due to the absence of vitamin A, and which affects thousands of them with blindness. The addition of one egg a week to their diet during autumn and winter, or the annual expense of a dollar, is sufficient to avoid this affection. The abuse of overwork, night work, women's labour and child labour, and the unhealthiness of the workshops are beyond imagination. The majority of the foreign colony of Shanghai some years ago considered it "ridiculous and unheard of" for Chinese women working eleven hours a day on their legs, without intervals for meals, to demand the provision of benches, and the abolition of labour for children under 10 years of age.

³ When placed on a national basis, standardisation becomes normalisation.

⁴ This has been studied from the international standpoint by the International Institute for the Scientific Organisation of Labour, in conjunction with the International Labour Office.

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which applies to industry, to agriculture, commerce, finance, administration, education, assistance, and even to housekeeping the principle of constant analysis of all the factors with a view to the rational reconstitution of human activities, too long abandoned to routine and negligence; a wastage which sacrifices large sums of money and brings unnecessary suffering to millions of human beings.

When during the war a great part of industry was placed under government control, it became possible for the first time to study its functioning on a large scale. The advantages of scientific management were recognised, and improvement in the conditions of labour appeared as one of the essential factors of output, to such an extent that, in order to hasten the production of munitions, France, England and the United States instituted an eight-hour day in the munition factories and increased the number of medical and social services in industry.

Scientific management is applicable inside every factory or office. When aiming at co-ordination of the whole of an industry, and then of a more or less considerable part of the productive activity of a country, it becomes *rationalisation*, which is first national, afterwards international. While the study of particular industries, revealing weak points and errors, leads to reorganisation which does away with avoidable losses, increases the output and improves the conditions of work, the study of production and distribution as a whole discloses waste, overlapping, a want of co-ordination and plan, that can only be rectified by *planned economy*, which, conciliating economic necessities and social needs, leaves to industry an autonomy in which employers and wage-earners can solve their own problems, on condition that they do not disregard the general interest.

Every government has entered this field with subsidies, credits, guarantees and orders, with taxation and transportation duties, customs duties and quotas. The rate of rents and loans, and even the price of corn and bread, are often now regulated by law. Government controls not only the national currency, but sometimes the transactions in securities, and banking operations. It is only the Soviet Republic which possesses a completely planned economy. Italy, Germany and the United States,

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without modifying the basis of their economic system, impose State control upon industry. The idea that national activity can be self-governed by the free play of competition, appears to be less and less rational and justifiable. The conflict of individual interests does not necessarily tend to the general welfare. Too often, on the contrary, the consumer is sacrificed, the man subordinated to the machine and production directed towards individual profit, not toward actual requirement. Such a condition should be corrected by an organisation which will make humanity master of its own destiny, by liberating it from misery and servile labour.

Miss Van Kleeck, of the Russell Sage Foundation, who has devoted her life to the study of the social problems in industry, writes that the wealth of a nation is measured by the equilibrium of production and consumption, realised by the most economical utilisation of labour and natural resources with a view to the satisfaction of the legitimate needs of the population. Everything which is diverted from this object does not enrich the nation, but on the contrary impoverishes it. To speak in terms of dollars is a fallacy; we must speak in terms of human needs.

In this functional economy, it will no longer be tolerated that some should do a full day's work while others are unemployed. Through the domestication of animals man has doubled the energy at his disposal; through the machine he has increased it seventy-seven times in the United States, and this increase has no limits. A more equal distribution of work, leading to a reduction of hours, would be "the liberation of man by the machine" (Dubois); the end of "man's hard labour" (Hamp). Sir Harold Bowden, vice-president of the Federation of British Industries, voiced recently the opinion that it will never again be possible to revert to a full day's work. The problem of the immediate future is that of "pensioned leisure", and if we would organise and look ahead instead of groping in the dark, these questions would be tackled by industry itself, employers and workmen acting in concert. In his opinion it is inevitable that, in the future, the career of the labourer will be abridged, the period of his occupational activity coinciding with that of his greatest efficiency. He will pass a much greater

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part of his time in enjoyment of the leisure which the machine has procured for him. The sooner we recognise that intelligence, aided by the machine and rational methods of work, has supplanted physical force, the sooner shall we evolve a method by which the abundance of riches which man can produce shall be placed at the service of humanity.

We have seen the evolution of industry ending in rational organisation. To the economic, technical and hygienic problems is added a psychological problem. We now understand that the mental attitude caused by a feeling of insecurity, injustice and oppression affects efficiency, and consequently should engage the attention of the employer. Scientific management thus expands into a human organisation of labour. Industrial psychology has been the object of deep study in different countries, from the Institute of the Science of Work at Kurasaki (Japan) which has undertaken the psychotechnical examination of 10,000 workmen, to the University of London, which grants a diploma in industrial psychology. The suggestions of the National Institute of Industrial Psychology of London have raised production from 5 to 60 per cent. according to the cases; they have reduced breakages by 53 per cent. in Lyons restaurants, and the personnel have always found that the reforms introduced have lessened fatigue and made work more agreeable. Mr. Seebohm B. Rowntree, one of the most important English chocolate manufacturers, estimates that the psychological service of his factory (directed by his son who has made a special study of this subject) saves him £10,000 pounds a year. Commerce should follow this example.

Occupational guidance and selection and the campaign against the psychological factors of fatigue are only two of the spheres of industrial psychology. The most important perhaps is the *improvement of the psychological atmosphere in industry*. Everything which offends the sense of personal dignity, everything which disgruntles the worker and makes him passive, causes discontent, reduces production and tends to conflict.

Collis has classified the mining districts of England, on the one hand, according to the occupational mortality, on the other

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hand, according to the votes in favour of the strike in 1921. The two lists are parallel: bad conditions of work gave rise to the greatest amount of sickness, and at the same time spread a condition of chronic discontent.¹ Industrial psychology teaches that improvements should be made in the choice and training of foremen. On these depend the quantity and the quality of production, the training of apprentices and the general atmosphere of the workshop.

As Oliver Sheldon remarks, we ought to instruct foremen in the psychology of human relationship in industry.² We have not yet realised that the individual spirit, like the collective spirit of a human group pursuing a common enterprise, is a problem which has been insufficiently studied. Much research is necessary before we can understand the psychological elements which lead men to adopt certain attitudes, to experience unanimously certain sentiments, or to react in a certain manner in given circumstances.

Manufacturers themselves recognise that it is necessary for them to acquire a knowledge, not only of the social problems of industry, but of its human factors and of industrial psychology, which requires frequent and intimate contact with their personnel, on a footing of equality. Schools have been established for the education of employers.³

Every thwarted instinct produces mental reactions, manifesting themselves by instability, discontent and revolt. But one of the deepest instincts of man urges him to assert his personality and manage his own life. Accordingly, certain manu-

¹ The same comparison may be made from the international point of view, the annual number of working days lost owing to industrial conflicts is lowest in New Zealand, where working-class protection is the most advanced.

² This is studied by the International Industrial Relations Institute (the Hague), formed by the employers, workmen, technicians of industry, sociologists and social workers; by the International Labour Office, the Russell Sage Foundation, etc. It has also been well described by Dubreuil.

³ Discussions between the management and the personnel are not limited to questions of discipline, wages and hours of work. For example, at a meeting held at the head office of the London, Midland and Scottish Railway Co., the competition between the railways and motor transport, the cost of methods of transport, etc., were discussed.

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facturers cede their absolute authority to create a working-class representation. With a view to ending the incessant conflicts which are sometimes so violent as to be spoken of as industrial warfare,¹ the relations between employers and employed have been regulated by collective conventions, which sometimes assume the proportions and solemnity of a Constitution. For many years at Chicago, for example, industrial parliaments have deliberated wisely. Industrial courts are a national institution in Australia. Industrial courts of arbitration and conciliation are generalised in Italy under the name of "magistracy of labour".²

In England and in the United States, it is the good understanding of those interested which has established the Whitley Councils and similar Boards. The clothing industry, in New York, twenty-two years ago created its labour inspection, its social insurance, its standard conditions of work, its hygienic and medical services, its courts of arbitration. The whole of this organisation is maintained by equal contributions from the employers and the workers.

Representation of the personnel satisfies the feelings of the workers, who are offended by having to be passive; it has usually improved their conditions of work, protected them against arbitrariness, and initiated them into the economic necessities of industry. The manufacturers and the community derive no less profit from it: more stable workmanship, reduction in the number and gravity of conflicts, greater progress in technical improvements, strengthening of administrative authority, and, lastly, increase of production by greater good

¹ Strikes occurred in ancient Egypt. Both strikes and voluntary limitation of production were known in the Middle Ages. The number of strikes has been considerably reduced by improving the material and psychological conditions of labour.

² The first Council of Arbitration and Conciliation was formed at Wolverhampton for the building industry (1869); the first factory Council (called Chamber of Explanation) was created by Weiler in 1877 at the Charbonnage de Mariemont in Belgium. A meeting of the delegates of employers and workers in London has been called the "Locarno of industry". Miss Van Kleeck has retraced the history of a mine in Colorado which emerged profitably from a quasi-military organisation to an industrial democracy.

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will, self-respect and enjoyment of work.¹ It is not a question of efficiency only, but also of personal development which should be allowed and even promoted by industry, for this is the *raison d'être* and therefore the right of every human being.

It is becoming admitted that production is not solely a means of making money at any cost, but a social function in which participate capitalists, technicians, wage-earners, the public as consumer, and the State itself, which guarantees the security of the producers, maintains the lines of communication for the sale of their merchandise, and secures for labour the necessary training. This is the spirit which has inspired the industrial codes of the United States, the Labour charter and the corporative conception of Fascist Italy. In this field again enlightened employers have played the part of pioneers.

John D. Rockefeller, junior, has written a book to demonstrate that legislation by itself is incapable of solving the industrial problem. Its solution can only result from the introduction of a new spirit in industrial relations, the spirit of co-operation and fraternity. He has established labour representation and profit-sharing in all his industries.

Another experienced man of business, Lincoln Filene of Boston, states that industry, having become a prominent social force, should make men even more than money and goods, and this by industrial democracy.

Owen D. Young, a manufacturer, financier and distinguished American statesman, declares that the spirit of invention, the improvement of technique and the courage to take bold initiatives are more essential to industry to-day in the social domain than in the technical field.

To recapitulate : the first improvements took place in machines and methods. With the advent of the hygienist provision was made for the needs of the human machine. Our present concern is with the feelings of the worker, which commences the psychological era.

While formerly industry appeared to be purely a technical

¹ Inquiry has shown that enjoyment of work only exists in 7 to 17 per cent. of working men and women. Some experience an actual "psychic inanition" (Henri de Man).

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problem, experience has shown that the quantity, quality, economy and continuity of production depend on : *health*, which insures the *power* of production ; general and occupational *education*, which develops the *talent* of production ; *contentment*, which engenders the *will* to produce.

Purely material stimulation is not enough. A factory which offered 50 per cent. higher wages did not succeed in enticing away a single workman, because it had a bad reputation among the men (Farmer). But concern for the general interest may arouse emulation.

Lastly, industry like every directive power in human affairs must choose between two alternatives : to rule slaves or guide team workers. By the first method, the Pyramids were raised and immense fortunes made, but the Panama Canal was constructed, and still greater benefits obtained by the second method. Workmanship subject to slavery impedes the progress of technique ; on the other hand, the healthy worker, trained, prosperous and welcomed as a collaborator, is for industry a guarantee of stability and progress.

CHAPTER X

DOMESTIC FACTORS

WHETHER regarded from the point of view of health, morality, well-being, or the turn given to life, the home is the primordial element. We are, no doubt, to a large extent moulded by our occupations: the conditions of work regulate the duration of domestic life and determine our disposition when we return home after our day's task. No doubt, economic, health, and educational factors also play an important part in the life we lead apart from our work. It is nevertheless true that our life is chiefly centred in the home; to provide everyone with a pleasant and healthy home is the first condition of social progress.

Bad housing conditions are not the consequence of the rapid increase of agglomerations of people, they are also found in small country towns. They result from the absence of protective laws and institutions, and from the poverty of a large part of the population.¹ Many investigations have shown that slum dwellings give rise to physical deterioration, an increase in morbidity and mortality, especially as regards infectious diseases (tuberculosis, measles, whooping-cough, diphtheria), and a rise in the general and infant mortality.

An objection may be raised that these are not the effects of slum dwellings, but of the poverty of the inhabitants or their hereditary defects, physical and mental. There may be a certain amount of truth in this statement. But we have already cited the example of Liverpool, where the slum-dwellers were removed

¹ Institutions which study the housing question are the International Union of Local Authorities (Brussels), the International Federation for Housing and Town-Planning (London), the International Housing Association (Frankfort) and the International Congress for Public Health Works (Geneva).

to sanitary quarters, with the result that their mortality was reduced by a quarter. According to the Baltimore inquiry referred to in a preceding chapter, other things being equal, the overcrowding or unhealthiness of dwellings increases the infant mortality by one-sixth. We have also mentioned Bradbury's thorough investigation in North England, proving that bad housing is an autonomous factor of tuberculosis.

Juillerat established in Paris the sanitary record of each house : 38 per cent. of the deaths from pulmonary tuberculosis between 1894 and 1905 occurred in 13 per cent. of the total number of houses ; the construction of supplementary windows reduced this mortality by a third.

But these are not the only evils of slum dwellings ; they banish decency, discourage the desire to learn, stifle all aspiration to a better life, and lead to alcoholism and crime. Morality, it has been said, is a question of square feet. No family life is possible under these conditions, which are even a negation of civilisation. As to furnished lodgings, in which a large proportion of the working class live, they are hardly any better, as regards health, morality and thrift. They do not allow any family life. Slavery will never be entirely abolished till the day when these blots on our civilisation are completely effaced.

From the health standpoint we must distinguish between : the unhealthy dwelling (from its situation, construction, or its want of repair) ; the overcrowded dwelling (more than four persons per room 90 to 140 square feet according to German authorities ; more than two according to English ; more than one according to American and Belgian authorities ; there is also overcrowding when the kitchen serves as a bedroom) ; the overpopulated area.

It is this last condition which, combined with the general conditions of urban life, makes the housing problem a more serious issue in towns than in the country. But this problem is not limited to agglomerations of people ; many rural houses are unhealthy and overcrowded, and agricultural labourers are not always better provided for in this respect than industrial workers. Moreover, since the middle of the sixteenth century, rural sanitation has made less progress than urban.

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In 1920, at least 70,000 houses in England were unfit for habitation, and 300,000 presented grave defects. A tenth of the population lived in overcrowded houses : 760,000 persons in London, 3 millions in the provinces ; 148,000 lived more than three in a room, and 31,000 more than four in a room.¹

In 1928 in Berlin, 47,000 dwellings consisted of a single room, which served as kitchen, living-room and bedroom for the whole family ; 336,000 contained only two rooms ; 70,000 persons lived in cellars and 45,000 in garrets.

Many families are reduced to taking a lodger, even when they are pinched for room. Sometimes even, several families, strangers to each other, live in a single room.

In Berlin one patient out of five has less than 26 cubic yards of air at his disposal ; 73 per cent. of the socially insured affected with disease of the lungs share their room with others, 8 per cent. share their bed.

In France, 18 per cent. of families have only a single room to live in.

In New York, in 1927 a Committee appointed by the Mayor, reported that more than 2 million persons, a third of the population, have no satisfactory home and sometimes live under deplorable conditions. For thousands of them the word home is a mockery. It consists of two or three small rooms, only one of which is properly lighted (and that not always), and none of which is sufficiently ventilated. These rooms in the heat of summer constitute an inferno, in which young children, the sick and debilitated suffer actual torture. For the inhabitants of these dwellings there is no privacy and no possibility of isolation ; all phases of their existence are displayed before the neighbouring families ; they have to use a common w.c. ; they have to fetch their water from a common tap ; fire is a constant menace for them.

If this, at the period of prosperity, was the lot of one-third of the population in one of the richest and most civilised towns in

¹ To give an idea of the housing shortage still existing in England, in spite of a remarkable building effort by the State, local authorities and private initiative, let us note that in 1933, for London only, 700,000 persons called at the central housing office to obtain lodgings, while nearly 125,000 inquiries were made by letter

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the world, and if, as Dr. E. E. Wood says, less than half the habitations in America measure up to the minimum standards of health and decency, we can imagine the conditions of housing in most other countries. In nearly all the large towns we find horrible situations: crowded in damp and dilapidated hovels, without air and without light, sometimes in garrets exposed to the rain or in cellars periodically flooded, families have to struggle every day, not only against vermin, but also against rats.

And what is to be said of those countries, chiefly in central and Eastern Europe, where the peasant lives in a wooden hut, with no other illumination than that of a tiny window-pane which cannot be opened, without any furniture, the whole family—grandparents, parents and children of all ages—working, eating and sleeping on a heap of dead leaves in the company of goats, pigs and fowls, to say nothing of cats and dogs. What is to be said of the East, where, in Bombay, out of 1,100,000 inhabitants, 100,000 occupy a single room in groups of 5 to 10 persons, 250,000 in groups of 10 to 19, 15,000 in groups of 20 or more.

The housing problem is both universal and urgent. The solution can only be found by improvement of existing habitations and the construction of hostels, apartment houses and individual homes.

Improvement in the existing housing conditions should be ordered by law or by municipal authority. In England, each district possesses a sanitary inspector who is empowered to enforce repairs or demolition. Housing improvement is also the work of associations such as that initiated by Miss Octavia Hill. Having become, in 1864, receiver of rents for a large London landed proprietor, she founded, at the suggestion of Ruskin, the system by which, after carrying out the necessary repairs and ejecting undesirable tenants, the receiver of rents is transformed into a social visitor who, with the housewife, attends to the domestic arrangements and the well-being of the family, especially of the children, for whom a common room and a garden are reserved. In each house a tenant living alone, or a girl with several hours a day to spare, is paid to attend to the cleanliness of the passages and stairs. Sub-letting and overcrowding are prohibited; a fixed sum is allotted annually for repairs, and if this is not all

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spent the balance is used for improvements suggested by the tenants, who therefore take pains to keep the building in good repair. The capital thus invested brings in 4 to 5 per cent.

Hostels and clubs are most serviceable for isolated individuals : bachelors, widows and workmen who are strangers to the town. Hostels and clubs have various central services : lavatories, baths, laundry, kitchen, dining-room, sitting-room, library, sometimes a gymnasium, a playground, a swimming-pool. The Rowton Houses in London (1893), the Mills Hotels in New York, the Women's Palace, the People's Palace and the City of Refuge of the Salvation Army in Paris, and the Männerheim in Vienna belong to the first type, Workmen's Clubs and the Homes of the Y.M.C.A. and Y.W.C.A. to the second type. Some employers have preferred to build a series of smaller houses, each for a dozen employees or shop-girls, the management being entrusted to a steward.

The construction of *apartment houses*, often grouped in a block, is inevitable in large towns. In Germany and Austria, especially, these "cities" inhabited by the families of workmen and employees, are provided with communal services, a co-operative shop, an assembly room, library, laundry, shower bath, a day nursery and kindergarten, a playground, and a Health Centre. But although morality, health and comfort benefit by this system, the quarter is overpopulated, unless as in the Viennese "cities" it possesses large gardens. At all events, life in these "cities" is more or less restricted. To avoid this inconvenience, series of three-storey houses have been built, in Holland especially ; each storey is reserved for one family and has its own entrance-door and staircase. The three-storey house (including the ground floor) is often, in spite of appearances, more economical in construction and upkeep than an apartment house with four or more stories ; the more tenements are superposed, the greater are the requirements for exits and general services.

The most satisfactory solution for a family is the *individual house*, provided with a garden. It is the only dwelling-place where life is really normal from every point of view. However, even in a town such as Amsterdam, which is very advanced in its housing policy, only 6 per cent. of the houses have this character,

while in the whole of Holland 72 per cent. of families occupy individual houses.

If left to the initiative of proprietors the housing problem cannot be solved. It is true that Mr. J. D. Rockefeller, junior, has constructed satisfactory workmen's dwellings in New York, which bring him a moderate rental, but his example has not been followed. Such an enterprise does not appear to be attractive, even in the United States. Most often, model dwellings, built for the working classes, become occupied by families in easier circumstances, who alone are able to afford the rent. The problem is an economic one; workmen can hardly save more than one-sixth—and often much less—of their wages for rent. For this sum, the majority cannot obtain suitable accommodation.¹

Thus if the population is to be decently housed, philanthropic agencies and public authorities have to supply 50 to 70 per cent of the rent, not only for the indigent and semi-indigent, but also for the mass of workers and clerical employees. This need has been recognised as far back as 1830, when a Belgium employer, de Biolley, built houses at Verviers for his workers; the first housing co-operative society was founded at Philadelphia in 1851.

For the last forty years, but especially since the war, public authorities, in order to remedy a shortage which rose to more than a million houses in England and 200,000 in Belgium, have provided land (by transfer or expropriation), arranged loans at reduced interest, offered premiums for construction, subsidies for rent, a guarantee on mortgages and a reduction in taxes on land and buildings. They have also counteracted the raising of the price of land by modifying taxes and by establishing building areas.

As a rule, the State does not build on its own account. It promotes the formation of public utility societies, housing trusts and building co-operative societies, which often combine to

¹ In Germany, 70 per cent. of families earn less than 1,800 marks. In England, more than 500,000 families with three or four children have an income of 40 to 50 shillings a week. In Paris, the construction of a tenement, composed of three rooms and a kitchen, costs 64,000 francs, which represents a rental of 5,300 francs. The average wage being from 11 to 12 thousand francs, the rent should not exceed 1,600 to 1,700 francs. These figures date from before the crisis. The advance of technique may some day allow of more economical construction, by the building of standard concrete or metal houses.

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organise regional or national services for the drafting of plans and the purchase of materials.

But local authorities, county councils and, on the Continent, the public assistance boards have engaged in numerous housing schemes.

By their action in the field of housing public authorities obtain a triple result ; they reduce the housing famine, they raise the standard of comfort and hygiene for homes in general, and they lower the rents. Public utility societies and public authorities build more cheaply than individual proprietors, owing to the reduction of general expenses, to the rational use of the land, to the standardisation of plans and materials and to the elimination of profit. Experience shows that such a housing policy in no way paralyses private building. In Holland, between 1915 and 1929, the public authorities built or assisted in building 200,000 dwellings, while private enterprise, which built 20,000 a year before the war, doubled its output. In Copenhagen, the public authorities and private enterprise built an equal number of dwellings ; one tenant out of five occupies a dwelling built by the public authorities or thanks to their subsidies. In Vienna, one person in seven is lodged in a " block " built by the city, but private building had not diminished before the economic crisis. In England, since 1918, more than 2,500,000 houses have been built for the wage earners, 50 per cent of them with the help of State grants ; only 12 per cent. of these houses have no garden. In Germany, between 1919 and 1931, the building co-operative societies have erected 2,500,000 dwellings.

The most urgent needs to be satisfied are those of poor, tuberculous and large families.

The minimum family accommodation comprises a living-room of a least 180 square feet,¹ a kitchen-scullyery ² of at least 100

¹ The height need not exceed 8 feet. A window should occupy the greatest part of one side of each room.

² The use of the kitchen as a living-room has two advantages : the kitchen stove provides warmth, and the children are more easily looked after. But the objections are considerable : steam, smoke and noise, the danger of burns to the children, etc. Moreover, under these conditions a separate scullery is required so that no space is gained. The problem is simplified by sending the children to day nurseries and kindergartens.

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square feet (with bath or shower-bath, unless a bathroom has been provided), a w.c., and three bedrooms of at least 100 square feet, one for the parents, one for the boys and one for the girls. The place must be carefully studied in order to facilitate the housekeeping and the acquisition of good domestic habits. Smaller tenements can also be constructed, for bachelors, families with no children, families with one child, or with two children of the same sex.

Owing to their grouping, dwellings built by the initiative of public authorities allow of the establishment of communal services, which we have already mentioned.

The occupiers of a group of dwellings ought to have a share in the management, which includes letting regulations, selection of tenants,¹ collection of rents, supervision of upkeep, repairs and improvements and administration of communal services. It is advantageous to entrust the management to a district nurse, a social worker or a trained housekeeper, whose assistance is valuable in the organisation of community life: clubs and meetings, gardens and window gardens, children's fêtes, games and sports, excursions and holidays, the co-operative buying of coal and other articles, etc.

Some families need to become accustomed to the use of installations which provide them with new conditions of comfort and cleanliness. In Holland, for families refractory to a healthy domestic economy, special dwellings have been created in which social workers and trained housekeepers provide education in the form of actual guardianship. The desire for freedom stimulates progress.

The acquisition of a family home should be encouraged, by means of long-dated loans guaranteed by mortgage and life insurance. But caution is necessary lest the benefits enjoyed by a large family, for example, end in leaving an aged couple in possession of too large a dwelling when their children are married, or lest these habitations become the object of rental or sale, the result of which would be to instal families having no right to these benefits.

¹ They should form groups as homogeneous as possible in their social standard and mode of life. The tuberculous should be housed in a separate dwelling.

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Furnishing is of considerable importance. The present custom incorporates it to some extent with the dwelling by replacing movable furniture by fixed installations. This is a rational equipment which simplifies and facilitates domestic life. Electricity has contributed much in this direction. The central distribution of steam for heating and of hot water saves labour and money.

The decoration of dwellings, not less important than the furnishing, is equally transformed. It is no longer the apanage of ease and wealth.

There is no need for us to discuss here the situation, aspect, grouping, plan or style of dwellings ; these concern the architect, the decorator and the hygienist. We may note, however, the tendency to replace sloping roofs by flat roofs on which gardens can be constructed. A lost space, which may amount to 40 per cent. of the ground area is thus regained for a useful purpose.

Will the concentration of the population in towns, the necessity of reducing the number of servants and simplifying domestic life end in a form of existence which will be that of a phalanstery, in which everyone will have his cell, as Le Corbusier predicted, or will the towns be entirely devoted to business purposes and be deserted by the population, which will settle in the near or remote suburbs ? We see these two tendencies existing simultaneously without being able to predict whether one will predominate over the other. But the only healthy life is that which keeps in touch with nature. The child who has only known city pavements is deformed physically and mentally, if not atrophied. The second solution therefore appears to be the better.

Henceforth, at any rate, it is urgent to contend against overcrowding, noise and smoke. In many American towns smoke has been completely eliminated, and there are several practical methods by which the production of industrial fumes can be suppressed.¹ The inexplicable complacency of the authorities is the sole cause of a situation which deprives us of a third of natural light, entirely eliminates the ultra-violet rays which are so neces-

¹ Smoke from coal arises from incomplete combustion, which represents a loss to industry. The latter would gain materially if measures were taken against smoke production.

sary to health, plunges large towns in a thick fog for whole days, and exposes us to slow intoxications which kills vegetation and contaminates our lungs, clothes and houses.

Housing policy should be based on :

1. Ascertaining the necessary number of dwellings ;
2. Setting up national, regional and local housing services, having for their object the administration of funds, the drawing up of plans, the purchase of material, and contingently, construction itself ;
3. Enacting a code of construction,¹ and establishing housing inspection services ;
4. Passing special legislation and granting funds allowing the construction of a sufficient number of dwellings and the eradication of slums.²

The public authorities can either issue or guarantee loans, or borrow from insurance companies, savings banks, or obtain funds by mortgage, etc.

This policy must never be relaxed until the final goal is reached, that is the disappearance of the last slum and the last overcrowded room. Holland and the Scandinavian countries are beginning to approach this ideal, and England is determined to attain it. In Italy 142,000 rural houses will be reconstructed, and 1,400,000 repaired, in execution of a State-wide plan.

Where are the ejected families to live ? Often they refuse to move and spread themselves in neighbouring districts, which in their turn become overcrowded. Rents are raised, and when model dwellings are constructed the people show little inclination to live in them. We have also to consider the cost of these operations, which may be reduced by decreeing that the compensation paid for expropriation should not be based on the revenue obtained from the property, but on that which it may legitimately represent, when its unhealthiness and age,

¹ Building regulations were established by the ancient Greeks. In Germany since 1924 building on court-yards has been prohibited.

² In England, a recent law compels all local authorities, urban and rural, to present a five-years plan for the eradication of slums : 266,000 dwellings will be destroyed, 285,000 constructed, and 1,240,000 persons re-lodged

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and its proximity to other insanitary dwellings are taken into account.

The greatest defect in certain parts of towns, large and small, is the exaggerated density of building and the overcrowding of districts. A redistribution of the population is indispensable; this necessitates the erection of new quarters, satellite towns and suburban colonies.

If the building of communal dwellings appears to be sometimes inevitable, the ideal solution is the garden city,¹ comprising a central arterial road reserved for commerce and public buildings, while the rest of the city consists of detached dwellings bordering on avenues² in which straight lines are avoided. The alignment, dimensions and style of these houses are fixed by general regulations. The number of houses does not exceed 12 per acre. The garden city contains co-operative stores, playgrounds, a Health Centre, a public institute with library and assembly hall, a nursery school, etc. It is surrounded by an unbuilt area which limits the growth of the city.

Each house has its ornamental garden and its vegetable garden, an important point in the development of family life and healthy recreation. The vegetable garden provides a certain amount of food and improves the quality of the diet.

The garden city is managed by its tenants, who take pains in improving its attractiveness and in the establishment of public services. Life in the garden city promotes the civic spirit, and produces emulation in the appearance of the houses and gardens, in the care of the children, and in devotion to the general welfare.

The garden city may belong to the public authorities, to a society, or to a co-operative group of tenants. Some railway companies and certain manufacturers create garden cities for their personnel. This system now exists in nearly all countries.

Two sets of figures will give an idea of the benefits obtained from garden cities: At Port Sunlight, a garden city built by Lord

¹ This idea is due to Ebenezer Howard (1898), who devoted his life to it. Raymond Unwin developed this system with success. The first garden city was that of Letchworth (1903).

² In Radburn, in the United States, every street passes under the main road, thus reducing the risk of accidents to a minimum.

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Leverhulme for his workpeople,¹ children weigh on an average several pounds more than the children of the council schools in Liverpool, a town adjacent to Port Sunlight, and the general death-rate in 1912 was 8 per 1,000 (as against 13 for the whole of England); one of the lowest figures in the world. In the garden city of Tergnier, belonging to the Northern Railway Company in France, the infant mortality a few years ago was 1 per cent., when it was 11 per cent. for the whole of France.

The garden city may be enclosed in a town, when it is a garden area; or it may adjoin a town, when it is a garden suburb; or it may be isolated, when it is a garden city proper.

The situation of these new communities must be chosen judiciously; easy, frequent and economical means of communication must be established, and for each garden city, an atmosphere must be created which will attract the group of people for whom it was intended.

From these considerations it follows that the housing question is only part of a larger problem, that of urban life. Town planning is a science concerned with the collection of facts about the growth of cities and the study of its laws. This was already practised in antiquity and in the Middle Ages. It is taught in the Universities and in certain Institutes. It borrows from *human ecology* (the study of the distribution and relations of men, under the influence of the forces of environment), from urban and rural sociology; from architecture, engineering, sanitation, hygiene, social economy, from the political, financial and administrative sciences, and from æsthetics.

One of its first functions is to make a monograph and draft a development plan of a town, a documentary procedure which enables the evolution of communities to be regulated, not only on economic lines, but also according to æsthetic and hygienic requirements, while imparting greater power and unity to collective life, and more comfort to individual and family life. A

¹ This garden city costs Lord Leverhulme's soap factories £25,000 a year. He estimated, however, that solely from the material point of view, the health and good-will of his personnel repaid him more than this sum.

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town-planning scheme, says George Risler, is only the transcription on paper of the moral and material needs of the inhabitants of a town.

Town planning is concerned with physical, economic, industrial and social factors, with lines of communication and means of transport, with parks and playgrounds, schools, theatres, assembly rooms, municipal buildings, hospitals and clinics, public services, markets, cemeteries, and lastly, the distribution of dwellings by means of *Zoning*, or the division of a town, by municipal authority, into exclusively industrial, business and residential areas.

The advantages of this system are obvious, from the hygienic and æsthetic point of view, and also from that of proprietors, always liable to depreciation of their land or buildings by the erection of a noisy and malodorous factory. All the large towns in America and a number of less important communities have adopted Zoning, by which 40 per cent. of the urban population of the United States have benefited. This system is now being adopted in other countries.

Planning is no less necessary in villages than in towns.¹ In many districts the village is no more purely agricultural. Invaded by townspeople or by industry, it has lost its traditions and its individuality, to the detriment of morality and beauty. A richer and healthier life will be restored to the rural districts by the drawing of a general plan and rules for building, dealing with the alignment, dimensions and style of the houses, their detachment by garden plots, the substitution of hedges for walls of enclosure, the preservation of trees, and the concentration of commercial and public buildings in one place or in a central arterial road. The style of these buildings, like that of the houses, should be strictly rural; climbing plants should be introduced; public and civic services like those of garden cities should be created; and the civic sense should be developed.

¹ The initiative of an enlightened man can transform a community. The miserable village of Nettlestedt in Germany, inhabited chiefly by cigar-makers, has become unrecognisable owing to the action of a schoolmaster, Meyer Spellbrink, who built twenty model dwellings, which were soon imitated, then a bathing establishment, a home for the debilitated, and an assembly room in which the people organised theatrical performances.

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The village house, especially that of the agricultural labourer, should accord not only with the laws of health and domestic economy, but also with the special requirements of country life.

But the rational organisation of civic life cannot be confined to the limits of a community. Moreover, the expansion of towns inevitably leads them to influence a whole region.

Again, the laws which in many countries prescribe to communities of a certain importance the drawing of a town-planning scheme have themselves provided for regional plans.¹ In England these plans are actually drawn up for a territory which is so extensive as to embrace three-quarters of the population. Urbanism may extend to a district, to a county, to a region or even to the whole country. The preservation of forests and natural beauty spots, the creation of means of communication, the foundation of new industries or of new communities, the distribution of electricity and water, all these problems are interested and should be regarded from a national angle. An interesting example of regional planning, which serves health while adding to the wealth of the country, is the reclaiming of marshy regions, so well realised in our time in Italy, where owners are compelled to conform to the general plan by developing their land and cultivating corn. Hundreds of farms and two towns have arisen on the land of the Pontine marshes, from which fever had driven away man.

In former times towns and villages developed by hazard ; when the situation became intolerable, streets were made at great expense and congested zones demolished. No trouble was taken to interest the inhabitant in his neighbourhood ; there was no plan, no foresight.

Town planning will create the material and living framework of the future city, the visible symbol and instrument of a closer and healthier community life.

¹ These laws lay down rules relating to plans for alignment and allotment, the right of expropriation by public authorities, methods of valuation and indemnity, the prohibition of building in certain zones, redistribution of parcels of land, the determination of road duties and the taxation of vacant land, etc.

CHAPTER XI

ECONOMIC FACTORS

OUR whole material existence is governed by the resources at our disposal, and this influence extends to our intellectual life, to our morality, to our health.

From the well-to-do class to the poorest class, mortality becomes doubled. Infant mortality may be three times, and the mortality from tuberculosis twenty times greater in one quarter of a town than in another. Below a certain economic level, the growth of children is retarded, health declines and disease breaks in and produces invalidism.

Apart from the influence exercised through the kind of occupation, housing and medical attention it imposes, the want of resources acts on health by causing insufficiency in food, clothing and rest. There is no doubt as regards the question of food. It is true that adults and even children sometimes tolerate a deficient diet for weeks and even years without showing obvious distress, but if examined more closely they reveal a diminished power of resistance to infectious diseases. In this respect the war was a gigantic experiment. In the countries which were unable to maintain their food supply, mortality and morbidity rose considerably; tuberculosis, pneumonia, bronchitis, anæmia, rickets and sometimes even osteomalacia produced terrible ravages in all classes of society. In Germany, it was found that the increase in mortality from tuberculosis was proportional to the reduction of the number of calories contained in the national ration. In Denmark, the mortality due to congenital debility increased in proportion as the consumption of butter diminished.

Insufficiency in diet may be due to financial conditions, to

ignorance of domestic economy, or to the absence of restaurants which provide substantial meals at a moderate price near the place of work. This problem has been solved by some manufacturers and administrative services by establishing cheap restaurants for their employees. Some agencies have installed canteens, either for women only, or for the general population.¹ School canteens fulfil the same purpose.

Nevertheless, there is always a shortage of these measures ; too many workmen and employees are still placed in the dilemma of snatching precarious meals or of spending a sum which they hardly can afford, especially by the obligation to consume alcoholic drinks, and those who are ordered special diets find great difficulty in following medical prescriptions.²

It is said that the food problem is more serious than that of alcohol. In any case it is universal and permanent, while alcohol only affects a minority of the population, and at certain periods of life. As stated by Jules Rochard, one of the pioneers of social hygiene, food is still the principal concern and anxiety of most people, and is necessarily the most expensive.

We shall return to the food problem in dealing with domestic economy (Chapter XIII).

Insufficiency of clothing and of footwear promotes rheumatic and pulmonary affections, especially among the debilitated and ill-nourished. Linen which is not washed often enough leads to affections of the skin and the breeding of parasites which may transmit typhus and other severe diseases. Hookworm, the scourge of tropical countries, would disappear if the inhabitants of these regions could buy boots, for the ankylostoma is a species of worm which lives in the soil and is introduced through the skin of the feet.

Insufficiency of rest is general in poor families ; overcrowding and promiscuity indoors, the crowding of two or more in the same bed, noisy surroundings, night work, returning late from distractions which have been sought outside owing to the absence

¹ The first restaurant for the working class appears to have been founded at Geneva about 1850. Soup kitchens were established in Bavaria by Rumford at the end of the eighteenth century.

² In the Soviet Republic 5 per cent. of meals provided in the community restaurants are "dietetic".

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of home comforts, the going and coming of different members of the family whose hours of work are different, the necessity for the housewife to continue her work in the evening, ignorance of the hygienic value of quiet hours—these are the reasons why, in the poorer classes, both adults and children hardly ever obtain the rest which is necessary for health. As for moral rest, freedom from anxiety, and any satisfaction that may reasonably be demanded from life, what part can they play under these conditions?

Insufficiency of rest must be met by the housing policy, by limitation of night work, by suppressing alcoholism, and by popular instruction in hygiene to explain how important is the daily recuperation of the physical and mental forces.

But it is mainly by the raising of wages that the problems of food, clothing and rest are to be solved.

In 1795, David Davies, a clergyman, concluded from the investigation of family budgets, that it was impossible for working-class families to lodge and feed themselves properly. His contemporary, Whitebread, agitated for the institution of a minimum wage. Later on, Ernest Engel, one of the pioneers of the study of family budgets, observed that the more resources are reduced, the greater is the proportion of income spent on food. This "Engel's law" enables the deficiency of income to be recognised at first sight.

For example, the normal budget of a workman in Ford's factory at Detroit, earning a minimum of 7 dollars during 225 days per annum, without including supplementary income from the work of wife or children, is estimated as follows:

Food	.	.	.	30.2	per cent. of the family budget
Rent	.	.	.	22.6	" " " "
Clothing	.	.	.	12.6	" " " "

In families of the lower middle class in Belgium, the figures are widely different (Julin, 1928-9):

Food	48.9	per cent.
Rent	11.7	"
Clothing	14.0	"

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For the whole of the Belgian working class, they were :

Food	58.2	per cent.
Rent	6.3	"
Clothing	.	.	.	.	.	.	14.4	"

In poor families, the amount spent on food may reach 75 or even 80 per cent. of the budget, although providing only a diet which is insufficient in quantity, quality and variety. This leaves hardly anything for rent, clothing, heat and light, furniture, cleaning, washing, personal cleanliness, medical attendance, intellectual needs or recreation.

On the other hand, there are families which, by suppressing their strongest instincts, attempt to remain in healthy lodgings by restricting their food in order to pay their rent. Such sacrifices sometimes lead to tragic results.¹

In general, actual wages (i.e. considered in their proportion to the cost of living) had increased since the war, and an improvement took place in the nutrition and well-being of the working class. But the economic crisis caused a set-back, producing in some countries a drain on resources, reduced to the lowest rate. It thus happens that the salary of a married schoolmaster does not exceed the sum considered as representing the minimum budget for a workman's family. The usual wages are so much below this minimum that, in these countries, there is hardly any difference between the condition of the unemployed living on allowances or assistance and that of the men at work.

In normal times poverty does not affect all ages equally. Children, especially the first-born, come into the world when the family income is proportionate to the needs. But as they grow up and their number increases, expenses multiply without

¹ At Stockton-on-Tees, the inhabitants of an insanitary district, after its demolition, removed to a municipal garden city, where the rents were higher. Contrary to expectation, the mortality rate in these families increased by nearly half, while that of the people who remained in another insanitary district diminished by a tenth. This paradoxical situation is explained by the practice of food restriction in the families which, in their desire to be better housed, spent most of their income on rent. In certain Dutch and Danish towns, in order to avoid the deterioration that would lead them to slums, the unemployed receive nearly the whole of their rent, in addition to an unemployment allowance proportional to the size of the family.

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any rise in income ; this is the first contact with poverty. The balance is re-established when the eldest become wage-earners. After marrying they experience again the changes which they have known in their childhood ; when they are 30 years of age, the family expenses cause anxious days ; when they are 40 the children's employment temporarily adds to the income ; at 50 the parents are left alone ; at 60 they sink into poverty for the third time, unless they are entitled to a pension or have managed to save in spite of unemployment, sickness and the vicissitudes of life. They have grown up in the slums, and they die in the slums.

It should be noted that the first of these periods of poverty affects the age of growth and puberty and makes a deep impression on the vitality of the organism. The second period, affecting women at an age which is still that of fecundity, bears on the descendants.

Many households fortunately escape these fluctuations : family allowances diminish their extent, and social insurance and assistance help in the most severe crises. It is nevertheless true that poverty always threatens a large part of the population.

Experience accumulated by the welfare services and agencies agrees with scientific research in showing that the causes of poverty are organic, economic and familial.

Organic causes are represented by disease. When this attacks the father, the family resources are jeopardised ; when it attacks the mother, domestic life is paralysed ; if it affects the children, their care is a drain on the family budget. Accidents, invalidism, old age and the death of the father may render this situation permanent.

Economic causes consist in insufficiency of income, due to too low a rate of wages, to unemployment, or to irregularity of work.

Familial causes include disproportion between the number of children and income ; ignorance or negligence of the principles of domestic economy ; desertion of the family by the father ; and lastly, alcoholism, gambling, idleness and vice.

The immediate causes of poverty are linked in a chain of

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circumstances : sickness is engendered by the overcrowding of dwellings, unhealthy occupations, low wages and insufficient medical attention ; low wages may be due to mental or physical incapacity, or absence of occupational training ; unemployment is the result of technical, economical and political factors ; errors of conduct are often the result of an unhappy childhood or of a morbid condition. Moral influences are associated with physical influences, individual or internal factors with collective or external influences.

Of the primary causes of poverty, the most constant is disease. On the other hand, low wages and unemployment exert a variable influence at different periods and in different countries. Statistics relating to the importance of these various factors have only a temporary and local value. Cases of poverty cannot well be classified according to the causes which come into play for these combine to form a vicious circle. Sometimes this commences with sickness which leads to poverty, sometimes with poverty which leads to sickness. In both cases, strength declines, discouragement follows, the family becomes disunited, and unless appropriate help is offered in due time, degeneration is the result.

The present unemployment crisis produces a form of poverty due to a single factor, independent of the individual or his environment—absence of work. The family, generally sound both morally and physically, strives courageously to preserve its self-respect and maintain the health of the children ; the father, and still more so the mother, submit to privations which are sometimes superhuman. Amusements are no longer indulged in, clothing is not bought, the amount of food is reduced, insurance subscriptions are no longer paid, a healthy dwelling is abandoned for an overcrowded one in a slum ; the mother goes out to work ; the children reach school tired and anæmic ; soon they cease to attend for want of footwear, and become engaged in badly paid blind-alley occupations. Young men can no longer think of a career or of marriage. In this atmosphere of desolation, family relations become strained, especially if the father is idle while the mother or the children supply the income. Paternal authority declines, the parents become

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irritable and the children undisciplined; the elder children often go far in search of a livelihood. This is latent famine, in which millions of unemployed live to-day.

These privations and disappointments, and the feeling that such a situation is unjust leads either to gloomy resignation or to a disordered life. Investigations have shown to what an extent health and character can suffer from such a state of affairs.¹ It would take years to repair the damage.

In patriarchal societies, based on the solidarity of the family and the clan, individual poverty was unknown. Family help and the assistance of neighbours have for centuries provided for the wants of the sick and infirm, and for old people, widows and orphans. This solidarity was extended to foreigners and travellers. However, it was impotent in the face of a general absence of resources. When famine threatened, the sovereign and the noblemen sacrificed their treasures and opened their granaries of corn or rice.

As social conditions differentiate, the role of private assistance becomes permanent; religion enjoins the distribution of wealth and submits it to meticulous rules; among the Jews,

¹ These investigations have revealed an increase in debility, rickets and tuberculosis, on the one hand, and of infants abandoned or laid at the door of charity, as well as a prevalence of criminality, vagrancy, prostitution and suicide, on the other hand. But in countries where social assistance has been better assured, especially in England, Holland and the Scandinavian countries, this recrudescence of evils has been almost completely avoided. A typical example of the efforts of unemployment on health is cited in a report of the International Save the Children Union: At Dunawitz (Styria, Austria) school-children become tired so rapidly that the masters are obliged to lay them on their benches to restore their strength. Chronic hunger compels them to devour everything that appears to be eatable, and lessons are continually interrupted by the children's vomiting. The smallest incident provokes a burst of sobbing. As there are often only a single pair of shoes and a single cloak for two or three brothers and sisters, one of the children goes to school while the others stay in bed. Extremely emaciated, pale and almost transparent, these school-children are pitiable creatures.

We must also mention the investigations of Jacquemyns in Belgium, those of the Czechoslovakian Social Institute, etc. *Memoirs of the Unemployed*, consisting of autobiographies of English unemployed, are moving human documents.

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and later among the Moslems, everyone is compelled to devote a stated portion of his income to charity.

Urbanisation relaxes the family bonds and neighbourly relationships. In order to meet increased needs, private assistance creates institutions, such as orphanages; the wealthy surround themselves with parasites and distribute occasional largess. Limited and precarious, these forms of help have soon to be supplemented by mutual assistance between workers and by public assistance, both already practised in Babylon, Greece and Rome.

Charity flourishes in Christian, Buddhist and Mohammedan societies, but the resources of the Churches proving insufficient, assistance becomes secularised. In the sixteenth century Juan Vives and Juan de Medina formulated schemes for methodical and individualised assistance, which, not content with maintaining the indigent, also proposed to rehabilitate them. But it is not till the nineteenth century that these ideas were applied, and assistance, hitherto palliative, became curative. Social case work having elucidated the causes of poverty, these are opposed by the organised protection of mother and infant, labour legislation, social insurance, education, public health and social measures which develop into a policy aimed at the generalisation of well-being.

In this way the action of public opinion, of enlightened employers, of the working class, of religious organisations, and of philanthropists leads from an individualistic view of assistance to the conception of social progress; empirical and casual help to a campaign against the century-old scourges of humanity, the programme of which was summarised twenty-five years ago by Sydney and Beatrice Webb: 'The malady of poverty is not a necessity. The problem of poverty is now capable of solution.'

Against the factors of poverty we set up a triple barrier.

The first is that of preventive measures: hygiene, housing policy, improvement in the conditions of life and labour protect the health; safety measures diminish the number of accidents; occupational guidance, training and selection procure more stable and remunerative employment; the organisation of

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trade, production and distribution attacks the causes of unemployment; an increase of wages supplies the necessities for the family budget, which can be better apportioned after instruction in domestic economy; a wholesome use of leisure-time tends to combat evil temptations.

This barrier repels pestilential diseases, arrests, in an increasing proportion, other transmissible affections, adds to the period of fitness and to life itself, checks the increase of accidents, and ensures better and more stable conditions of existence. By extending and fortifying this line of defence, we attack the roots of poverty.

Against unavoidable evils, and those avoidable evils which we have not been able to keep at a distance, stands the second line of defence. Social insurance organises the treatment of the sick and injured; it provides allowances and pensions for those deprived of their livelihood; family allowances meet the expenses caused by children. But these advantages are not open to all, and are not always sufficient. Unemployment insurance allowances, especially, are limited to a certain number of weeks. We must reinforce this system and fill in its gaps.

The third line of defence, guarded by assistance, should be impregnable in countries whose public assistance is legally obliged to help every person in need. If, in spite of such legal obligation, and in spite of the aid of private assistance, poverty is sometimes unrelieved or inadequately relieved, the fault lies in insufficient organisation and imperfect methods.

The study of preventive measures of the occupational, domestic, sanitary and educational order being reserved for other chapters, it is sufficient to consider here preventive measures of an economic order, which concern the rate of wages and unemployment. This will be dealt with very briefly, for sociological medicine cannot act on these factors, it is limited to relieving the effects which they exert on health.

From the medical, as from the social point of view, *wages* inferior to a normal standard of life, which are still common, cannot be justified. They are not even advantageous from the purely economic standpoint; unless assistance helps, insufficient

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wages lead to physical, mental and moral deterioration, which can only be remedied at great expense. In both cases the community pays for that which the employer would not disburse. Moreover, low wages paralyse economic life: the expenditure of the masses is far more important than that of the well-to-do.¹

For this reason clear-sighted employers have adopted the policy of high wages, which is the index of a good organisation, when it does not increase the cost of commodities, and consequently the cost of living. In western countries, "starvation wages" are hardly found except in women's labour, in casual labour and in home work. Some States have dealt with this situation by establishing a legal minimum wage.² But wages ought to provide much more than the bare necessities of life. Considerable sums are spent by the public authorities on housing, medical attendance, child welfare, education and other reforms. These sums represent a kind of complement to wages, which employers charge on the community. Considered from this angle, the usual remuneration for labour is inadequate.

There is no need to recall the fact that the rate of wages depends upon local, national and international factors of a technical, economic and political order. But the national wealth, in industrialised countries, should allow sufficient resources for everyone.³

¹ Raising all family incomes below \$2,500 to that figure would increase actual consumption by more than 16,000 million dollars. Adding \$1,000 to every family income below \$10,000 would increase consumption by about 27,000 million dollars. The actual expenditure in 1929 was 62,000 million dollars (Leven, Moulton and Warburton).

² The American "Recovery Act" states that economic redress is subordinate to the principle that all wage-earners will receive just and reasonable remuneration, sufficient to ensure them, in exchange for a limited day's work, a decent and comfortable standard of living.

³ Lord Melchett, leader of the chemical industry in England, writes as follows: "We have reached a stage where there is no excuse for poverty. . . . It exists not on account of lack of wealth but through our lamentable failure in finding adequate means for adapting distribution to production. . . . The whole world cries loudly for the establishment of an organised economic system, based on the theories of abundance, and also on a clear comprehension of the fact that material production only becomes wealth when it is placed at the service of mankind."

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With regard to *unemployment*, we must first of all consider its temporary or local forms. These can be anticipated and dealt with by the institution of a system of Labour Exchanges, by unemployment insurance, by the organisation of casual labour in occupations where employment is irregular, by the alternation of different forms of production in manufactures subject to seasonal influences, and in a general way by better arrangement and greater foresight in the management of business. As to the "chronic unemployed" in periods of prosperity, they are either incompetent or unfit; the former must be dealt with by training, the latter by medical treatment and eventually pensions.

There remains the grave problem of general unemployment. Does the responsibility for this lie with technical progress? If its immediate effect is to reduce the personnel, in normal times the latter can soon obtain other employment. This technological unemployment can be met by shortening the hours of work, not this time for hygienic, but for economic reasons, and also because the machine should enable the man to obtain a more ample life. Universal unemployment is due to a combination of economic, financial, political and psychological causes, but our capital error is the failure to raise consumption to the level of production. The world overflows with natural riches; it possesses the machinery, the technicians and the workmanship which should supply the whole of humanity with comfort and ease; however, everyone is restricted, and poverty spreads.

Three of the causes of this situation merit our attention. Cycles of expansion and depression in business, i.e. loss of equilibrium between production and consumption, which have followed each other since the dawn of the industrial era, lead to an actual economic and social waste. During periods of prosperity industry is over-capitalised, machinery is developed to extremes, and the population is drained towards industrial areas; then come restricted production, failures, reduced means of living, and unemployment. In the United States in three years (1929-32) the revenue from capital diminished by 21,000 million dollars, wages by 22,000 million; public and private

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assistance paid 500 million dollars to the unemployed; the cost of living was reduced by 12 per cent. Taking into account the sacrifices of owners, creditors and shopkeepers, it is estimated that three-quarters of the loss of income was borne by the working class.¹ Indeed, the conditions of existence descended to an incredibly low level: American social services, which had been provided with a refined technique, were compelled to return to more rudimentary methods, and only supplied inadequate material relief.

On the other hand, one-third or one-half of the revenue from capital is spent in increasing the plant, while nine-tenths of the wages are spent in consumption. Thus, an increase in profits adds to the capacity for production; but an increase in wages enhances the capacity for consumption. Hence the necessity, since it is consumption which is at fault, of raising the rate of wages and creating a reserve fund for periods of unemployment.

Lastly, the distribution of goods is even less rational than their production. From the factory to the consumer, merchandise becomes doubled in price. From the farm to the kitchen, provisions become three or four times and, in certain cases, ten times dearer. A plan of distribution aimed at the limitation of the number of middlemen and retailers, the extension of co-operative societies and stores, and the supervision of retail trade would considerably reduce the cost of living.

Our economic system, after having functioned blindly and spasmodically, seems now to have become paralysed.² Shall we escape from this impasse by monetary or political reforms, by the institution of a planned or at least rational economy? These problems are beyond our province, but sociological medicine should vigorously denounce a state of affairs which threatens not only present but also future generations. Social progress, which has been almost continuous for at least a century, is

¹ In England, the proportion was only half, owing to unemployment insurance.

² In 1933 the economic crisis had already cost the world 200,000 million dollars, as much as the World War (Woytnski).

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arrested, and may soon turn back. This is an intolerable situation which might be saved by courageous action.

After considering measures intended for the prevention of the avoidable causes of poverty, we come to the means of arresting or mitigating its effects: this is the domain of social insurance, child welfare and assistance.

The common defect, in most countries, is want of unity and continuity; those concerned are tossed between social agencies and services which ignore each other, whose action is limited to a certain category of people, a certain scale of existence, a certain age or sex, or a certain method of assistance.

First of all there is *social insurance*. By its very principle, it is rule-bound: a fixed contribution can only entitle to fixed allowances from the insurance funds. Actually, its application is more elastic: the insurance fund takes into account individual situations when it provides treatment in hospital, sanatorium or convalescent home, when it organises, with the labour exchanges, occupational guidance, apprenticeship and placing. But social insurance is divided into compartments: for accidents, occupational diseases, common diseases, invalidism, old age, pensions for widows and orphans, and unemployment. And this is not all; mutual benefit societies, company funds, trades-union funds and local and regional funds enter into competition.

In these conditions how can a wide and effective policy of assistance and welfare be organised? How can abuse be avoided, in the administration of the funds, on the part of the doctors, or on the part of the insured? It would seem logical and advantageous to organise, as Reutti proposed, a national Institute for Savings and Insurance which would open to everyone, from birth on, an individual account, maintained both by compulsory contributions and by optional payments. In cases of accident, sickness, old age, or unemployment, the insured would be supported as he is to-day, but he would be granted a premium for the years during which he had only drawn little from the funds. By this means unjustified claims on insurance and abuse of medical attendance would be prevented. The insured may arrange for a portion of his account to be handed to him

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for the endowment of his children or for further education, for the purchase of a house, of land, of implements.

The future will teach us what we may expect from this suggestion. Our system of social insurance is certainly too rigid, too much parcelled out, too isolated from the field of assistance, hygiene and technical education, and from the labour market organisation. It is neither sufficiently constructive nor sufficiently educational.

Child welfare is equally dispersed; as regards health, it depends on the health authorities; from the moral standpoint, on the judicial authorities; as regards instruction, on the education authorities; for material aid, on public assistance; in the occupational domain, on the Ministry of Labour.

Such conflicting efforts cannot be effective; child welfare should be under a single administration, extending over the whole country a network of Boards, having the following fourfold mission:

To provide individual assistance for isolated women—widows, divorced or deserted wives, wives whose husbands are invalids, prisoners or worthless—and children whose health, morals and occupational career are jeopardised;

To multiply, co-ordinate and improve the organisation of child welfare agencies, from infant clinics to playgrounds and hostels for the young;

To combat unfavourable conditions of labour, alcoholism, immoral literature and films unsuitable for young people;

Lastly, to promote the creation and development of groups of boy scouts, girl guides, the Junior Red Cross and similar organisations.

These Boards, which exist in Germany, Austria, Switzerland and the Scandinavian countries, keep in close touch with the educational, hygienic and welfare private and public agencies, and call on their services when needed. They undertake the guardianship of fatherless children or of those whose fathers are worthless or incapable. They supervise the boarding out of infants and children. They follow the career and health of adolescents. The National Institute for Maternity and Child welfare in Italy pursues the same objects, and has reported admirable results.

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In Uruguay, a National Council and a Ministry of Child Welfare have recently been instituted, with provincial services and local boards. The Uruguayan child welfare code commences with conception, by eugenics, and pursues the protection of the child under all its different aspects till the end of adolescence.

In Denmark the widest powers are given to the central committee and the municipal child welfare committees.

It is only an administration endowed with a general mission, and provided with a personnel well equipped for its task which can promote the welfare of *every child* in *every one* of its aspects.

Public and private assistance, again, suffer from the same parcelling out. In London, in Paris, there are thousands of philanthropic societies; on the other hand, in many countries, each local authority is charged with the provision of public assistance which it often has no means to organise efficiently. Assistance, insurance, public health, child welfare, school medical inspection, labour inspection, and housing policy are all under independent direction.

Thus social action is incomplete, unequal and scattered. Doctors, nurses, social workers and inspectors visit the same families in the name of various organisations. Over-lapping is frequent, and important gaps remain unfilled. Philanthropic institutions are wanting in resources. The small municipalities remain impotent.

In several countries an effort at co-ordination has been made, the private agencies associating themselves into local unions and national federations. In some cities they have their offices in a Social Service Building, where they maintain jointly a library, a central case registry, an information office, a research bureau, a staff of social case workers, a case discussion committee, and so on. In Paris the local Unions of Social Agencies maintain in each ward an office where social workers advise every person claiming information or help. In the United States the local Councils of Social Agencies map out the field between the various organisations, fill the existing gaps and better their methods by mutual comparison. The Community Chests launch a yearly campaign for funds, which are distributed

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among the associated agencies. This brings more resources, with less expenditure and effort, than the collections, fêtes and sales formerly undertaken by each individual agency. Regional, national and international Conferences of social work also help to bring some unity into the field of social service.

As regards public assistance, it has been transferred in Germany to intermunicipal unions, in England and in some parts of the United States to the county. Representatives of social agencies sit on the Public Assistance Boards in order to ensure co-ordination between public and private assistance.

In some German towns public health, public assistance, child welfare and housing administrations are grouped together in a Social Welfare Bureau, which maintains an executive personnel consisting of district doctors, nurses and social workers, who are not specialised in child welfare, tuberculosis, etc., but do a generalised service in the area assigned to everyone of them.

In England, the central services for public health, mother and child welfare, housing and town planning, the administration of the poor law and of the various insurance and pensions systems have been united in a single ministry—the Ministry of Health. In the Scandinavian countries, the administration of labour legislation is added to the above, to form the Ministry of Social Affairs; in Poland, it is known as the Ministry of Social Welfare.

Denmark only, since 1933, thanks to Professor Steincke, possesses a form of legislation which generalises and co-ordinates social insurance, public assistance and maternity and child protection, into an organic plan of social welfare. From 1919 to 1933, the town of Vienna, with Seitz, Breitner, Tandler and Glockel, instituted a remarkably complete and coherent organisation for education, housing, assistance, health and medical services. The Soviet Republic has gone still farther in this direction. It has attacked the very causes of social evils, so that unemployment, prostitution, vagrancy and poverty are on the way of being eradicated.

Every country would gain by organising and rationalising its social policy, which claims from the total public budgets a share

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estimated at 27 per cent. in England and the United States, 37 per cent. in Belgium, 54 per cent. in Germany—or 3 per cent. of the national income in the United States, 6 per cent. in Belgium, 8 per cent. in England¹ and 16 per cent. in Germany.¹ However, we are far from fulfilling every need; many gaps exist in occupational and domestic training, in assistance, in child welfare, in medical and sanitary services, in unemployment relief and in the organisation of leisure. If at this time it appears difficult to add to the resources of social services, their efficiency may be increased to a great extent by legislative and administrative reorganisation and by voluntary co-ordination leading to a more concerted action.

The public in general, and employers in particular, are often prone to regard social services as burdens, because there are no figures indicating what they produce to compare with what they cost. We must not overlook their human action, nor their material returns. The prevention of crime would cost less than the upkeep of prisons. To send a child to a holiday camp is less onerous than to care for it when it has become tuberculous. Moreover, the sums expended on social ends sustain the economic life of the nation. When we build workmen's dwellings, we benefit industry by providing employment for thousands of intellectual and manual workers; old age pensions and sickness and unemployment benefits pay the landlord, the baker and the butcher. Let us suppose that, renouncing the progress accomplished, the State ceased to provide education, maintain the hospitals and relieve families in distress, it would then be necessary for the manufacturers to take the place of the defaulting public authorities, in order to maintain their labour forces.

We cannot restrict social action; on the contrary, we ought to extend and deepen it. Every time we allow an individual, a family, or a group of people to descend below the minimum level of welfare and culture compatible with physical and mental

¹ Including, in all these countries, the budgets of social insurance and of general, occupational and domestic education (1928-30). These facts have been explained in my book on *Le Service social à travers le monde* (Paris, Colin, 1931)

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health, we impoverish our social capital, and prepare burdens for the future, since it will be necessary to relieve or maintain, at great expense, those whom we have allowed to fall.

But in the social budget we ought to make a wiser distinction between what has been somewhat crudely called unproductive and productive expenses. We regard the maintenance of old people, the infirm and the incurable as an obligation of humanity. The care of the sick and the reinstatement of social waifs is a still more imperative duty. But education, protection and prevention are more humane and at the same time more effective measures. At present, in all countries, too large a part of the social budget is apportioned to palliative and curative measures. A greater part should be devoted to preventive measures. In periods of crisis, especially, there is a tendency to sacrifice housing improvement, occupational training, and the organisation of leisure, in order to increase immediate assistance; but the urgent need of the sick and poor should not lead us to neglect precautions against sickness or poverty in those who are not yet afflicted with these evils.

It is not enough to establish a rational plan, the balance-sheet of the work accomplished must also be drawn up. Palliative and curative assistance ought to evaluate the results obtained; but these being for the most part immediately apparent, to omit this is of comparatively little importance. Preventive assistance, on the other hand, having a long-dated effect, must verify the efficiency of its methods by statistics and by actual social measurement.

It has long been a question what tasks should be reserved for public assistance, on the one hand, and for private assistance, on the other. It has been feared that extension of the former will injure the latter. Events have shown that this is not so; private assistance only atrophies when the resources of the well-to-do class disappear. But it cannot compete with public administrations; in spite of the flourishing condition of private agencies, their total budget, even in the most prosperous times, did not exceed two-thirds of that of the public social services in the United States (it is now one-tenth as regards relief), a quarter in England, and still less in other countries.

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Also its resources are precarious. At times of economic crisis, the amount provided by private generosity diminishes, while the number of cases needing relief increases. The United States, which formerly rejected the principle of social insurance, and considered public assistance as a makeshift, have been compelled to modify their opinion in this direction. However beneficial, however ingenious it may be, private assistance is not enough. It is only well established in the large centres of population, and its action is weakened by the sacrifice of time and effort, which its leaders and agents have to make in order to procure resources.

The co-ordination of public services and private agencies being realised, and a plan of action established, it remains to choose a method. This should evidently be individualised as far as possible. The division of those in need of assistance into categories, and the application of standardised methods to them is arbitrary and futile. The variety of situations is as endless as their causes. Medical treatment requires attention to the individual; we try to individualise in education; social service should also be individualised.

Such a social service for individual cases, the philosophy and technique of which have been explained by Mary E. Richmond, implies an inquiry leading to a diagnosis, which is not a label, but a synthesis of the elements of the case. These elements serve as a basis for a plan of treatment, which cannot be put in force without the collaboration of the interested party and his family. The object is not only to satisfy urgent needs, but to readjust the man to his social circle, and should consequently act on one as on the other. Attempting the study of human nature in adversity, releasing liberating influences, constituting a school of happiness for the disinherited, social case work is a work of time and patience, which must be continually readapted to a changing situation. Material relief is only one of its elements. Psychological and sometimes psychiatric factors play an essential part. To straighten the sagging curve of destiny, favourable individual characteristics must be utilised; the interest of relatives, friends, and employers must be enlisted, the mutual dependence of human beings relied

upon¹; all the resources of medicine, psychology and education will be used to promote a better understanding of the situation and to enlarge the horizon of those whom we wish to relieve. Social service may sometimes be limited to casual help or advice, but its essence is reciprocal confidence, the mutual desire to give something of oneself. This is precisely the opposite of an overbearing or pauperising form of charity. The schools of social work train a personnel initiated in this science and art.² It is beginning to spread in public assistance services and in private agencies; social workers are attached to schools, industrial concerns, hospitals and asylums, to the police, the courts of justice and prisons.³ This training should permeate administrators, doctors, nurses, inspectors, visitors and voluntary helpers.

To make oneself useful to one's neighbour one must like him; it is also necessary to understand him and know how to help him. Charity ill-directed goes astray. Many errors are made in this sphere. Take for example, a deserted mother; instead of giving her the means of rearing her child, she is too often separated from it; irreparable harm is thus done to both. When a debilitated workman has only irregular and badly paid employment, instead of improving his health and finding him other employment, many agencies are only providing him with a meagre pittance.

In numerous cases the inquiry is summary, no written record is made, medical examination is omitted, healthy and decent lodging is not procured, the indigent are not enabled to join a mutual benefit society which would insure them against the vicissitudes of life, the disabled and tuberculous, in their discharge from a sanatorium, are not cared for; no recreation or employment is found for the blind, the crippled, the mentally deficient or the uninterned insane, no measures are taken on behalf of beggars, vagrants or discharged criminals. Does every

¹ The Rev. Thomas Chalmers called the help that the humble give to each other "the invisible funds of charity".

² There exist an International Committee of the Training Schools for Social Work and International Conferences of Social Work.

³ To entrust an inquiry or any form of social case work to a person having no social training will one day appear as strange as sending a sick person to any one but a doctor.

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hospital organise occupational therapy and recreation, does it always respect and cultivate personality? Abandoned children and orphans are often sent to institutions, instead of being placed in selected families, grouped around a supervising centre; aid is frequently refused to "non-deserving persons" on the evidence of incompetent judges, although from the social and individual points of view these are the cases which require most attention. Assistance is generally granted day by day, sparingly and reluctantly, or else it is calculated on a fixed scale; it should depend on the calculation of a normal budget, the resources of which should be completed in the necessary proportion.

Along with social case work, social group work—clubs, can-tees, homes, hostels, libraries, social settlements, community organisation—tend to prevent the situations which call for the intervention of assistance and facilitate the relief which it undertakes.

To sum up, the three great defects which social work too often exhibits are its scattered character, the lack of method and continuity in the protection granted, the delay in instituting action. The law, the public services, insurance funds and charities only begin to move when the need is evident and pressing, whereas the need should be prevented. It is also important not to relax our efforts until afflicted families, the sick or indigent, widows and children are fully re-established in life. Voluntary and professional agents should be well acquainted with the principles of the science and art of social service. The individual ought to be helped in his adaptation to society, but we must at the same time arrange that society provides for everyone conditions acceptable to him.

CHAPTER XII

SANITARY FACTORS

WE have now examined the influence of occupation, housing and resources, i.e. economic and social conditions, upon health.

Medical and public health organisation plays a no less important part. The public health services supervise sanitation; dispensaries combat social diseases; clinics and school medical inspection protect mothers and children. Curative medical treatment restores the capacity for work, extends the duration of life and arrests contagion. Lastly, preventive medicine exerts a powerful action on the preservation of health by inoculations and periodical medical examinations.

The public health machinery has not only reduced the ravages of disease and checked death, it provides us with such security that the economic depression has not so far raised the general death-rate,¹ while the crisis of 1846-8 led to an epidemic of typhus and provoked a recrudescence of tuberculosis to such an extent that in several countries, however prolific, the deaths outnumbered the births.

No doubt this relative immunity is not due solely to medical and hygienic services; assistance, health and unemployment insurance, the maintenance of living wages, popular health education, physical culture have also played an effective part. Sanitation alone is evidently incapable of preventing the effects of poverty on health, it can only check them. Moreover, the amount of medical care available is, to a certain extent, dependent upon individual resources.

¹ The death-rate has increased in 1933 and 1934 in many cities in the United States, and it is considerably higher among the unemployed than among the other groups. On the average, children did not grow as much in height and weight during the years 1933-4 as they did during the period 1921-7, and the rate of growth was smallest among children from unemployed families and families on relief (Palmer).

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Health services have a quadruple mission to fulfil :

(a) To teach and diffuse individual hygiene ;

(b) To supervise public health in all its forms : the sanitation of towns and villages, housing policy and town planning, inspection of food and of domestic animals, detection and isolation of the contagious, and occupational hygiene ¹ ;

(c) The promotion of maternity and child welfare, as well as the detection, treatment and re-education of persons affected with tuberculosis, venereal disease, alcoholism and mental troubles ; this task is entrusted to dispensaries ; they differ from the out-patient departments of hospitals and from the usual clinics in their preventive, educational and social capacity ; they are in the charge of a physician and a public health nurse or health visitor.²

(d) Lastly, to develop eugenics and preventive medicine : preventive inoculations and examinations. The latter, improved and expanded by the New York Life Extension Institute,³ not only reveal latent affections, but also disclose anomalies and lead to the adoption of healthier habits. These examinations have prolonged the life of those who have submitted to them to such an extent that the Metropolitan Life Insurance Co., which financed this work, was not only reimbursed but realised a substantial profit.⁴ Many other life insurance companies in Europe, America and Japan now offer annual preventive examinations to their clients.

Health examination before marriage, of which we have spoken elsewhere, is also a preventive examination, but it is characterised by a special study of hereditary factors.

In the majority of States public health, which at that time only

¹ Occupational hygiene generally entails a special administration.

² The sanitary work of these nurses is not sufficiently appreciated by the public. In England, the 7,252 nurses of the Queen's Institute of District Nursing, make 18 million visits a year. In country districts they manage nearly all the maternity cases. In New York, the 282 nurses of the Henry Street Settlement paid 565,000 visits in 1932.

³ From 1914 to 1934 inclusive, this Institute has carried out more than a million examinations. Medical examination of students and continued observation of their health are the rule in America, Germany, Italy, and, in France, at Nancy and Strasbourg.

⁴ Out of 100 defects revealed by a summary examination, 50 per cent. are corrected after two years ; after a more complete examination, 88 per cent.

dealt with sanitation, dates from the middle of the nineteenth century. At first, endowed with very modest means, and often without a real autonomy, it encountered the indifference of the public and the authorities, as well as the opposition of all those whose interests it threatened, by exposing food adulteration, combating prostitution, alcoholism and the abuse of narcotics, powerfully defended by those who enriched themselves in exploiting these evils, and by warring against slum dwellings and speculation in land. Public health has suffered no less from a lack of co-ordination with housing, rural sanitary police, school medical inspection, sanitary works, alcohol regulation, and the medical services of assistance, insurance and labour.

The first countries which, accepting tardily the advice of Jeremy Bentham, Sir John Simon, Virchow and Littré, created a Ministry of Public Health were the Soviet Republic in 1918, England in 1919 and France in 1920.

Whatever the scope given to this department, it is impossible for it to include all the services concerned with health; the health services of the army, of the navy, and of the colonies cannot be removed from their respective ministries; but an interdepartmental committee should link them together. The utility of such co-ordination can be made clear by an example; to effect a continuous individual observation of health, following the child from birth to adolescence, would require uniting together the work of the infant welfare clinics, pre-school clinics, school medical inspection, and health protection of apprentices. The medical inspection of recruits, which is now a simple eliminatory test, might be made the occasion of extending this supervision; tuberculous, debilitated or neuropathic recruits would be treated instead of being rejected from the army and navy. Moreover, the individual health record brought up to date by the services which we have mentioned, would facilitate the medical examination of recruits. This work would be continued by the medical insurance service, which, in some countries, already includes preventive examinations in its programme.

Co-ordination is not less necessary in county and local administrations. Here also hygiene, assistance, insurance, housing and child welfare should be brought together. But the dispersion

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created in some countries by the multiplicity of local authorities must be avoided; in nearly 38,000 municipalities in France, only 159 have more than 20,000 inhabitants and 22,000 deal with less than 500 persons; the same situation exists in Belgium. In these countries, except in the large towns, hygiene and assistance are wanting in resources and in organisation. To remedy this state of affairs, Germany has formed intercommunal Unions; the United States, England and Italy have transferred sanitary and social services to the county councils.

This co-ordination must be extended to health work undertaken by private initiative. This is the function of the National Health Councils which exist in the United States, Germany, Belgium, Czechoslovakia, Finland and Siam, generally in connection with the Red Cross. Regional and local agencies ought also to unite as they have done in Germany, Italy and Switzerland. The public departments as well as the medical and nursing associations are represented in these federations. In the United States the national associations dealing with child health, tuberculosis, venereal diseases, mental hygiene, and so on, have transferred their offices to those of the National Health Council. Here they maintain general services and plan their common campaigns. They have even considered the formation of a common fund. This Health Agencies Building is the counterpart of the Social Service Building, which we have mentioned in a previous chapter.

The co-operation of health organisations among themselves and with the public services makes it possible to draw up a general health plan for the nation, instead of individual, unco-ordinated programmes.

The national health service should have three antennæ: a division of vital statistics, a public health laboratory and an investigation bureau; these three services will supply the data for epidemiological and sanitary studies. They should also include a central nursing bureau and special sections ¹ for popular education, housing and town planning, sanitation (water supply,

¹ A section for occupational hygiene and the prophylaxis of occupational diseases should be added, if no special service for this object has been established

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drainage and domestic nuisances), food inspection, especially of milk, and veterinary inspection ; for maternity and child welfare, including school medical inspection,¹ campaigns against infectious diseases, tuberculosis, venereal disease, mental affections, alcoholism, cancer, affections of the heart, diabetes, blindness and infirmities² ; lastly, for preventive medicine and eugenics.

The regional services will resemble the central service on a smaller scale. They will exert their action on sanitary regions of about 50,000 inhabitants, subdivided into sanitary districts of 6,000 at the most (the optimum would be 2,000), for each of which a public health nurse will fulfil in families, schools and dispensaries the triple duty of nurse, hygienist and instructress.

Apart from nurses, and technicians whose assistance may be required (architects, engineers, chemists, bacteriologists, statisticians), the whole personnel will be recruited from graduates of the higher schools of hygiene, and will not engage in medical practice.

These services exist now, in a more or less complete form, in the large towns. They are too often non-existent in rural districts, where hygiene is neglected to such an extent that, in spite of the hygienic advantages of the country, its mortality often exceeds that of the towns.³

Everywhere we are in conflict with dispersion ; at present, the school doctor, the doctor in charge of the infant welfare clinic and the doctor in charge of the tuberculosis dispensary work independently in separate institutions. These should be grouped in a Health Centre, a co-ordinate body embracing consultations for preventive medicine and inoculations, a prenatal clinic, an infant welfare clinic, a clinic for pre-school children,

¹ There is in many school medical services a great deal of hurried examination, with too little emphasis upon the detection of serious physical defects, and a lack of corrective measures (American Child Health Organisation).

² Sometimes malaria, hookworm, trachoma, leprosy, sleeping sickness, etc.

³ In France and Belgium, half the population lives in municipalities unprovided with a water supply, two-thirds have to go without drains, without service for the removal of domestic refuse, without medical notification of births and deaths, and without the aid of a public health nurse.

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a school dispensary, anti-tuberculous, anti-venereal and mental hygiene dispensaries. It will also include the office of the medical officer of health, of the district nursing service, and of the public assistance and private social agencies, lastly, baths, and a wash-house divided into separate compartments, in which housewives will wash, dry and iron their linen. Other additions may include a laboratory, departments for dentistry, ophthalmology, oto-rhinolaryngology, X-ray and ultra-violet light treatment, a gymnasium, and in some cases a day and night nursery, and a canteen. Beds will be reserved for the isolation of contagious patients, and for maternity cases. A first-aid station will also be installed. These Health Centres, the conception of which comes from the United States, have been established in Canada, England, Belgium, France, Poland, Latvia, Czechoslovakia, Hungary, Yugoslavia, Bulgaria, Roumania, Spain, Germany, Austria, Turkey, Palestine and China. Like the department stores, with which they have been compared, they promote economy in general expenses; they are convenient for doctors, nurses and families; they rely upon a co-ordination which makes them more efficient than scattered institutions.

In Yugoslavia and, on the initiative of Scott Williamson and Ines Pearse, at Peckham, the Health Centre has become at the same time a social centre, providing physical culture, recreation and friendly relations. Most morbid conditions have a psychological factor which is due to the monotony, mediocrity and disillusion of life among the masses.

The Health Centre generally becomes a permanent institution for the demonstration of hygiene: placards, exhibitions discussions, and gatherings of mothers and future mothers.

These demonstrations assume a still wider character when in the whole district they create a model organisation for infant welfare or for the prevention of tuberculosis, or even a complete service of preventive and curative medicine, as the Milbank Foundation has provided in a quarter of New York, in an industrial town and a rural county. The advantage is twofold: the working of this organisation is put to the test of experience, and the benefit obtained by the community is demonstrated in a striking manner. The amount of money spent on this object

need not be very high, and is largely compensated by the resulting gain in human life and strength.¹

With a view to protect the health of the population, the ancients did not confine themselves to the cultivation of public health: the Babylonians, Egyptians, Greeks and Romans had district doctors for the poor and for the slaves. No doubt there was an element of human pity in the creation of these services, but at any rate, as regards the slaves, they also had for an object the recuperation of capital represented by health and life.

Later on, hospitals were founded in Christian, Buddhist and Moslem countries. In this case charity was the dominant motive. At first, the hospital performed also the functions of an asylum for old people and invalids, an orphanage, and a hostel for travellers and pilgrims. With the dawn of scientific medicine it became a centre for teaching and research. In our time, occupational therapy, the organisation of recreation for patients, and other social services combined in restoring the patient, preparing him for a new occupation, helping him to resume work when he leaves the hospital, assisting him and his family, and making him appreciate the real values of life. In the words of Dr. Depage, the hospital is now regarded as an enterprise of social restoration; the principles of scientific management apply as they do in a factory; the aim, however, is to realise not a profit, but a human, spiritual and social mission.

Lastly, by the natural extension of its functions, by its equipment, its power of attraction, the hospital, henceforth pleasant, comfortable, respectful of the personality of the patient,² becomes

¹ For 2 dollars a head per annum—the price of a seat at the theatre or of 3 pounds of chocolate—we can, writes Professor Winslow, maintain a complete hygienic service, which will suppress typhoid fever and diphtheria, diminish tuberculosis and other infectious diseases, and lower the general mortality and the infant mortality. The public authorities and the population spend, on an average, every year one dollar a head for hygiene and 40 dollars for medical treatment: the disproportion is evident.

² This improvement has been realised through the disappearance of the common waiting-room, which will seem to our descendants as astonishing as the beds in the old Hotel Dieu, in which several patients were crowded, appear to us; abolition of the larger hospital wards, the reduction of noise, the improvement in meals, etc. (Dujarric de

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the centre of diagnosis and treatment for all classes of society and is so greatly transformed that, as Dujarric de la Rivière remarked, even its name might disappear: it is the House of Health.

But although it contains the whole equipment for curative medicine, it leaves the organisation of preventive medicine to the Health Centre. This duality is not justified, either in theory or practice. Curative medicine and preventive medicine are closely connected with each other, and no definite line of demarcation can be traced between the infant welfare clinic, which regulates an infant's diet, and the pediatric out-patient department, which treats its digestive troubles; between the anti-tuberculous dispensary, which provides artificial pneumothorax treatment, and the out-patient department for chest diseases, which prescribes drugs; between the anti-venereal dispensary, where treatment cannot be dispensed with, and venereal clinics, which undertake nothing else but treatment; between school medical inspection, which is not fully effective if reduced to simple diagnosis, and the school dispensary, where treatment is prescribed.

On the other hand, it is a duplication of staff and equipment to construct and maintain, side by side, a preventive Health Centre and a hospital, when both ought to possess a laboratory, X-ray and ultra-violet light apparatus, baths, departments for stomatology, ophthalmology and oto-rhino-laryngology. The proper place for the Health Centre is at the hospital, next to the out-patient department. This system, which is logical, economical, effective and convenient for the community and the medical staff, restores its unity to medical practice and medical education. It is realised at Nancy and in the Soviet Republic, and works perfectly.¹

At present we possess a multiplicity of medical institutions belonging to the State, the local authorities, the army and navy, and other public services, to mutual benefit societies, insurance

la Rivière). In some American clinics each out-patient is seen at a fixed time; this reduces waiting hours which keep women from their homes, and cause men to lose hours of work, leading to discontent, and mental and moral deterioration.

¹ The presence of a Health Centre, situated or not at a hospital, does not dispense with the establishment of a network of infant welfare centres and secondary dispensaries.

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funds, industrial concerns, religious bodies, private agencies, and to doctors and private individuals. Many of these institutions overlap and others are insufficiently equipped. Often there is no organised relation between the general hospitals and convalescent hospitals, hospitals for chronic diseases and mental hospitals. Entire regions are badly served.

Rationalisation is necessary with a view to improve hospital service and economise the public funds : this is decreed by law in England, Austria, Czechoslovakia, and New Zealand. The transfer of health and assistance administration from the municipality to the county council favours this plan, which should be sufficiently elastic to allow of private initiative, but at the same time checking wastage, filling gaps and raising the standards of equipment and service.¹

We have already seen that the organisation of public health leaves much to be desired : one child out of three enters the elementary school with neglected physical defects : one out of three recruits is rejected from the army : half the deaths due to pregnancy and parturition could be avoided, according to the statements of the English committee on maternal mortality and morbidity. No further evidence is needed to show that, on the whole, preventive and curative measures are insufficient in quality as in quantity. An extensive inquiry conducted in the United States has revealed that the richest class procures only 85 per cent. of necessary treatment, while the poorest class obtains only 40 per cent. Many of the sick are never treated, and medical care is often rudimentary. An investigation by Sir

¹ This will allow of an efficient distribution of general and special establishments, the standardisation of their construction and equipment, the rationalisation of their administration, their collaboration in purchase, and lastly a constant evaluation of their efficiency. These several points are dealt with in the remarkable report of a committee formed by the Health Organisation of the League of Nations and the International Labour Office, with the object of deciding the most suitable methods to safeguard public health in times of crisis. This report warns governments and public opinion against the fatal effects of a reduction in medical and sanitary expenditure. The only economies permissible in this domain are those which allow of more rational organisation. In France, Professor Parisot has clearly explained the situation and the measures to be taken.

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Arthur Newsholme, conducted in nineteen European countries, results in similar conclusions.¹

This situation is due to four causes: widespread ignorance of the necessity for early and proper treatment; carelessness and neglect; gaps in medical organisation, especially in the country; and want of resources.

The inquiry which we have mentioned establishes that the annual cost of medical treatment in the United States is, on the average, 40 dollars per person, but this varies for everyone from year to year and cannot be foreseen. The only means of meeting such a risk is by insurance. However, the necessary premiums are too high for many families. We should therefore anticipate contributions from employers and public authorities. This is realised by social insurance and subsidised mutual benefit societies. But along with their medical service there are the medical services of assistance, of occupational accidents and of industrial enterprises and public services. It would be advantageous to combine all these organisations into one and to separate health-insurance from the granting of sickness allowances.

In this way we should obtain a real national medical service, open to the whole population, up to a certain level of resources, as has been proposed by the British Medical Association and the Canadian Medical Association, in the general interest and in the interest of the medical profession itself. This proposal restores his necessary function to the family doctor now too often deserted in favour of specialists; it is he who will be called in, and he will command the whole arsenal of medicine.²

The main obstacle to this reform, is financial. But unification will lead to considerable economy. The base would be a net of combined hospital and health centres organised according to a rational plan. As in Strasbourg and many towns in Germany, the United States and Canada, physicians and surgeons will have there private consulting-rooms, and will so be able, without loss to themselves, to reduce their fees by 30 to 50 per cent. A fuller recourse to treatment by physical agents, psychotherapy,

¹ In France, according to Professor Bar, 50,000 women are delivered every year without the help of a doctor or a midwife.

² Mr. John A. Kingsbury, Secretary of the Milbank Foundation, has presented a similar project for the United States.

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dieting and hygiene will curtail pharmaceutical expenses, which are now excessive.

Team-work in medical practice will be more convenient and less onerous for the patient, and, on his part, the physician will have at his disposal a complete equipment and the knowledge of his colleagues; he will be aided by nurses and secretaries; he will be able to carry out scientific work; he will escape the isolation and want of contact with medical progress and the absence of stimulation and emulation which too often lower the level of medical practice; he will find remunerative employment in his earlier years and will owe his success to merit recognised by his equals. He will no longer be limited, as he is to-day, by the lack of resources and the prejudices of his patients. Sociological medicine will expand freely when liberated from competition which inevitably develops between preventive institutions and private medical practice.

The advantages of team work in medical practice were proved by experience in certain hospitals during the war; the patients had never been cared for so liberally and so scientifically, and the doctors had never had such freedom in their practice and in their investigations. In England especially, after the Armistice, the question arose of reorganising medical practice on this principle, as shown in a report presented to the medical Consultative Council of the Ministry of Health: in this report, Lord Dawson of Penn recommended the establishment of primary Health Centres, where practitioners would each have their own consulting-rooms; these centres would have been in touch with regional hospitals, the secondary Health Centres, which would have been connected with the teaching hospitals. This system in Belgium received the approval of the Council of Public Assistance; but nothing was done in the matter.

However, in the United States, clinics based on team-work have multiplied; many hospitals, open to all medical men, receive different classes of the population.

We have to choose between three systems: integral State medicine, such as is practised in the Soviet Republic, where local clinics group all forms of preventive, curative and educational medicine, private practice coexisting with State medicine

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as in the Scandinavian countries, where the public authorities provide gratuitous treatment or a much reduced tariff for both hospital and domiciliary treatment¹; lastly, an organisation of medical practice based on health insurance, and tending towards team medical work.

The professional medical associations are far from rallying to these ideas; they can, however, only hinder and not prevent an evolution which the progress of science and economic changes renders inevitable. At any rate, medical syndicates now understand better the social role of the practitioner, and the utilization of experience gained in practice, with a view to the progress of science. The increasing success of post-graduate courses is a good sign.² The difficulty met with in enlarging the point of view of the medical profession arises fundamentally, as Sir George Newman has remarked, from the fact that preventive measures have from the oldest times been connected with rules laid down by the individual and the community, and not with the activities of the medical profession. However, the ideal of medicine is to prevent disease, and the necessity for curative treatment is a tacit confession of failure. Medicine should not be solely curative and preventive, but also constructive or "perfective."³

¹ This system dates from the fifteenth century and has not ceased to develop. It has had the most beneficial effects on the public health.

² These are obligatory in Germany for doctors engaged in the public services, such as school medical inspection.

³ Sanitary problems are studied by the International Public Health Office (Paris), the Health Organisation of the League of Nations (Geneva), the Panamerican Sanitary Bureau (Washington), the Panamerican Child Welfare Bureau (Montevideo), the International Save the Children Union (Geneva), the International Child Welfare Association (Brussels), the International Union against Tuberculosis (Paris), the International Union against the Venereal Diseases (Paris), the International Committee for Mental Hygiene (New York), the International Bureau against Alcoholism (Lausanne), the International League against Rheumatism (Amsterdam), the International Union against Cancer (Paris), the International Union for the Prevention of Blindness (New York), the International Organisation for the campaign against Trachoma (Amsterdam), the International Hospital Association (Lucerne), the International Congress for Public Health Works (Geneva), etc. The Rockefeller, Commonwealth and Milbank Foundations, by introducing a rational reformatory policy, have stimulated health organisation throughout the world.

CHAPTER XIII

EDUCATIONAL FACTORS

EDUCATION of the masses, said Duclaux, is the strongest foundation of hygiene. It has propagated the knowledge of the care required for infants, spread cleanliness, contributed to the prevention of accidents, and helped in the campaign against tuberculosis, venereal disease and alcoholism.

As regards the role of general education, this is obscured by too many circumstances to appear clearly. The school gets rid of certain prejudices, but it does not always give an effective instruction in hygiene, and still less often a true education of our habits; but, instruction alone will neither free us from our inclinations nor our weaknesses. So we find, even in the best-educated classes of society, the most unpardonable errors in hygiene, and too often a profound ignorance of the part played by sanitary science in individual and community life.

Nevertheless, educational factors could increasingly be made to exert a considerable influence on health, by the formation of personality and character in the child, by instruction in personal hygiene and domestic economy, by occupational training, and by a broader and more rational use of leisure-time.

It is only a few years ago that a science for the study of children was constituted, based on observation and experience. Formerly, all that was expected from the teacher was a knowledge of the subject which he taught; to-day, he should also have a knowledge of the child, and occupy himself with the study of its body, its intelligence and its character.

The child was regarded as an adult in miniature: at 7 years of age he was assumed to have reason. We now know that

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each period of infancy has its own mentality, its own needs and dangers.

The child was expected, at any cost, to absorb certain educational ideas and moral rules. This operation was directed by authority, the child remaining passive. No distinction was made between different temperaments and aptitudes. In the inevitable conflicts of authority, so interpreted, with the active nature, individuality and instincts of the child, recourse was taken to punishment and reprimands.

The parents and teachers considered that the children belonged to them; plastic matter which they could fashion at their will.¹

The ignorance of parents on the nature of children has weighed and still weighs heavily on the rising generation. Educated men and cultured women still think that they can educate children without having prepared themselves for this difficult task, that the child should be broken in instead of being understood, punished instead of being enlightened, restrained instead of being guided.

The child is the product of its inherited instincts, its health, its physical and moral environment, its instruction and its experience. Every human being is born with his or her own character, a group of tendencies that ages have developed for the adaptation of man to his environment, but which should be canalised by education in order to become adapted to the present social and moral conditions, so different from those of primitive man.

The influence of health on intelligence and character is as clear as that of heredity; with individual exceptions, physical, mental and moral development exhibit an undeniable correlation.² Hygienic care of the body is as necessary for scholastic progress as for mental balance. Removal of the tonsils may change a bad into a model pupil. A dull mind may sometimes be sharpened by the administration of thyroid gland.

¹ "It is difficult to resist Samuel Butler's view that the educators of former times took a pleasure in torturing children. It is not difficult to make a healthy child happy, and most children will be healthy if their minds and bodies are properly tended. Happiness in childhood is absolutely necessary to the production of the best type of human being" (Bertrand Russell)

² Except naturally in countries where the school organises actual overwork and neglects physical culture.

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The environment is of capital importance ; children judge their parents, not by their words, but by their behaviour, and too often copy their faults. Keeping bad company is in many cases the origin of delinquency ; an important point is that these flaws in character show themselves between the ages of 5 and 10, sometimes even earlier.

Lastly, a child often sins through ignorance. He does not understand the bearing of his acts, and does not see where the habits he has contracted will lead. The want of understanding which separates parents from their children makes him live in a world of his own, which naturally he thinks is the only real one.

The task of the educator, complex and delicate, is to reconcile two distinct objects : to promote the development of all the possibilities inherent in the child, and to teach him to respect the rules of community life. Too strict authority leads either to rebellion or to a feeling of inferiority which paralyses the whole existence. Weakness is no less harmful. Above all things it is necessary to take pains to understand children and not demand too much of them ; to avoid hurrying, forcing, stifling or driving them. Character develops on a basis of good physical hygiene and favourable moral surroundings, by vigilant protection, the elements of which should not be a list of "do not", but concrete and positive advice ; each child ought to be given a certain freedom and responsibilities.

As Michelet has said, education is a co-operation, a friendship ; John Dewey proclaimed it as life itself, parents, masters and children educating each other.

Inaugurated in the United States by Stanley Hall, Thorndike and John Dewey, in Europe by Cecil Reddie, Decroly and Montessori, by Claparède, Ferrière and Pierre Bovet, modern pedagogy is honoured in Japan, Turkey and South America as much as in Europe and North America. It is individualised and active ; it attaches great importance to fresh air, contact with nature, fixed periods of rest and sleep, to regular and adequate meals, to cleanliness and the formation of good habits. At play and at work, by helping in the various school activities, by cultivating a small garden, by keeping animals, the child develops at the same time his mind, his muscles, his health, his intelli-

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gence, and his character. Competition is not organised, but collaboration ; the result of the child's acts is the only reward or punishment.

When commenced at a very early age, these methods transform slum children in a magical way, as attested by Sir George Newman, late chief medical officer to the Ministry of Health and to the Ministry of Education in England. They enable children of 2 or 3 years to acquire an independence and a sense of responsibility which do not usually manifest themselves till the age of 8 to 10 years. This is the experience of the National Child Research Centre in America. At Deptford, one of the poorest quarters in London, children who attend the open-air nursery school founded by Margaret Macmillan, attain the physical and mental standard of children of well-to-do families, although they return every night to a home which is often sordid and neglected. At 7 years of age they are alert, sociable and eager for life and fresh experience. They read and write fluently ; they speak good English and a little French ; they go to school joyfully ; it is a punishment for them to be kept away.

The same experiment has been made with equal success in other countries, especially in Italy and the Soviet Republic, where these methods are applied even in day nurseries and day and night nurseries. The results are surprising.

As a general rule, the child, however young, does very well when placed during the day in an institution where a competent personnel supervises health, diet and cleanliness, and guides the development of intelligence and character.¹ This is not surprising, for parents are rare who can ensure their children healthy surroundings, suitable diet, continuous supervision, selected and graduated tasks, and regular periods of rest ; rarer still are those who know how to "manage" a child. If it takes years of study

¹ In France, among infants placed under the care of foster-mothers specially selected and supervised by the doctor and nurse, the mortality is 3 per cent., whereas the death-rate of children reared in their own families is 7 per cent. A hundred infants placed from nine to twenty-seven months in a modern kindergarten in England measured, on the average, half an inch more and weighed two pounds more than 100 control infants. Among the former, 2 per cent. suffered from malnutrition ; among the latter 15 per cent. There was also a great difference in the condition of the teeth (Morrison).

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and probation for professional educators, how can we expect parents to have such knowledge and experience ?

It may be objected that it is bad to remove a child from its family. In reality, the regime of the institution should be exceptional ; the child has urgent need of family contact ; barring exceptional cases, orphanages and similar establishments should be replaced by foster-homes under nursing and medical supervision. The elementary school, the secondary school or the university are not accused of mutilating the family. Why then should the day nursery and the nursery school suffer this reproach ? Very few mothers can care during the whole day for their children, who are entrusted to a relative, a neighbour or a servant. Later on, they play in a room, in the kitchen, in the yard or in the street ; or else a governess, more elegant than experienced, takes them out to the public park. Are these the " advantages of family life " ? ¹

We no longer teach our own children when they reach the age of 6 years ; we recognise that the teacher can attend to them better than we can, and that the scholastic environment provides them with a training which the family cannot give. Is it then revolutionary to extend this system to the pre-school age, and even to early infancy ?

Experience proves that the fear of losing parental authority is unfounded ; on the contrary, parents acquire a keener sense of their responsibility and a fuller knowledge of their mission in life.

The nursery school, writes Sir George Newman,

liberates the mother without usurping her place. Parents do not feel that they have lost contact with a child by placing him in such a school. In fact, they tend to become more interested in him. The child enjoys the change from home to school and readily enters into the new life. The nursery-school environment greatly assists serenity of development and saves the child much of the strain which is inevitable in the ordinary home, where the needs of the elders constitute the central pivot of organisation, and the

¹ In country districts, children left to themselves certainly obtain fresh air and contact with nature, but their health is not supervised, and on farms they do not find favourable conditions for the development of their intelligence or their character. Modern nursery schools are therefore as beneficial in villages as in towns.

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little child has to be fitted in as well as possible. Moreover, the regularity of the nursery-school routine is beneficial to the child's health, whilst for an only child such a school may prove a positive salvation.

In the nursery schools conducted on these principles,¹ health obtains invaluable protection, for it is during the pre-school age that the various disturbances originate, which are afterwards discovered at the school age; the physical development of the child also profits by everything that aids in the development of intelligence and character, individual hygiene being a matter of habit and will. On the other hand, by relying on the co-operation of children among themselves and with the educational staff, these schools pave the way to the social sense. Sociological medicine is thus inseparable from rational methods of education, which apply to secondary schools and universities as well as to elementary schools, nursery schools and technical schools.

Instruction and education should be available for every child. This necessitates the creation, in sufficient numbers, of special classes and schools for the different categories of deficient and physical and mental abnormals: the blind and partially blind, deaf-mutes, the deaf and partially deaf, children affected with disorders of speech, epileptics, backward and mentally abnormal children, invalids and those suffering from chronic diseases. In London, especially, all these special classes exist; school children who cannot walk are taken by motor-bus. In the provinces, travelling instructors carry out the correction of pronunciation defects.

As we have already remarked, secondary education is no longer in certain countries the apanage of a minority. Some day it will become general, like elementary education²: public opinion will become more enlightened; family life and occupational activity will also gain. When education corporates the individual with the world, when culture is truly human, in short, when the school prepares for the whole life, it does not lead young people

¹ There exist: the International Federation of Teachers' Associations (London), the International Federation of Associations of Secondary Teachers (Rotterdam), the New Education Fellowship (London) and the International Bureau of Education (Geneva).

² Compulsory in Geneva since 1536, in Massachusetts since 1642.

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to desert the village for the town, neither does it create an intellectual proletariat, to judge by the experiences of the Scandinavian and Anglo-Saxon countries.

It would no doubt be beneficial to continue this action by obligatory civil service, which exists in Bulgaria and Germany, for both sexes. A healthy and orderly environment, disinterested work, co-operation, discipline, and a regulated form of life could not fail to have happy results. The young women would be initiated in the principles of domestic economy, puericulture, sick nursing and social service. The young men would serve a probation in social institutions, familiarise themselves with manual work, and learn to understand the realities of life.

The advancement of hygiene is dependent upon four essential factors : scientific discoveries, extension of sanitary organisation, intervention of the medical profession in a preventive sense, and awakening and education of the hygienic sense of the population. Up to a certain point the last factor dominates the other three, for the maintenance of research laboratories, the development of health services and the preventive action of the medical profession involve expenses which must be borne by everyone, either in taxes or in medical fees. Moreover public health legislation and services curtail individual liberty. The people will only consent to these expenses and inconveniences when they are " health conscious."

On the other hand, the action exercised by scientific discovery, by health services and by the medical profession is limited, our health depending mainly upon our mode of life. Personal hygiene being neither sufficiently understood nor appreciated, its practice is a long way behind its teaching. Popular education is a means of filling this gap. As Sir George Newman remarks, it includes three tasks : to arouse interest by propaganda, to teach by instruction, and to get action by the education of habits.

We need not give details of the procedures to be followed ; they include lectures, courses, posters, pamphlets, films, exhibits, as well as education through favourable conditions of environment and through various activities (such as the Boy Scouts, Girl Guides, Junior Red Cross, Mother's Clubs, etc.),

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and by advice from doctors, nurses and health visitors. Popular campaigns undertaken for the last fifteen years in all countries show how successfully the technique of publicity can be utilised in health service, how a health exhibit can be made attractive and educational, and how the teaching of hygiene can become living. It should not only figure in the syllabus of all elementary, secondary and higher schools, but should become a centre of interest. In this task, the school teacher, doctor and nurse are efficiently supported by groups, such as the Boy Scouts and the Junior Red Cross which have enrolled respectively 4 million and 15 million youngsters in the world.

Medical inspection at all stages of education, the school atmosphere and the example of the teachers will lead to the formation of healthy habits. The same principle will apply to the army and navy, the mercantile marine, to offices, workshops, hospitals and prisons. The action of propaganda will receive support from the Press, the clergy, the health organisations, private social agencies, medical societies, trades unions, mutual benefit societies, insurance companies, and social insurance funds.

One of the most important omissions is the absence of health instruction in the middle, higher and professional schools; an engineer or an officer is trained without acquiring the principles of hygiene as applied to the workshop or the regiment; appointments are made in the public services, in commerce and in industry without a knowledge of protection against occupational risks; a family begins life without any knowledge of domestic hygiene and the management of children.

The teaching of hygiene cannot progress without the hygiene of teaching: in this respect, it is not enough for the school to be clean, light and airy,¹ it is also necessary for the syllabus, the timetables, the methods of teaching and the discipline (self-government) to be based on the physiology and psychology of the child.

The child should have hours of freedom, which he can spend as he likes. As a general rule, in elementary and secondary

¹ The ideal is the open-air school, where school work is performed better and more rapidly than in the indoor school, in spite of the reduction of hours. Compared with indoor schools the open-air school is cheaper as regards the cost of ground, building and upkeep.

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schools, the morning hours should be sufficient for instruction, the afternoons being reserved, as in Germany, for drawing, music, manual work (indispensable to the development of the mind and to the judicious choice of an occupation), visits (to museums, libraries, public monuments, factories, health and social agencies), excursions, physical culture, games, gymnastics and sports. The midday meal, taken in common in the school, is not only a welcome supplement to the dietary of many children, and the means of avoiding the hurried journey to the home and back, but also serves for instruction in domestic economy and for inculcating good manners.

Sex education is essential. We cannot enter deeply into this delicate but fundamental subject. Although prudence is justified in a domain where individual reactions may be unexpected and disastrous, there is no doubt that want of preparation, not only for the sex life but also for married life is the origin of common misunderstandings and errors ; many lives are darkened, sometimes ruined. We have not yet civilised the sex instinct, and love is rarely a true embellishment of personality. It is said that the parents should impart this instruction, or entrust it to the family doctor or a clergyman. These solutions are certainly the best, but they remain exceptional. The results of inquiry show that children are initiated secretly, sordidly and incorrectly by domestic servants or older companions and by reading licentious literature. The falsehoods or the reticence of parents and teachers end with poisoning the child's conception of sex. What is the meaning of this cloak of silence and hypocrisy ? Country children are not ignorant of the reproduction of animals, and in towns and industrial communities, the housing conditions cause precocious and unsavoury revelations. Experience shows that youth brought up without false modesty, and without needless mystery enters upon life in a better state of mental and moral balance.¹ The first

¹ Amiel, whose life and works are so pure, said in 1861 : " Let us declare nature innocent, make it loved and respected ; let us put the idea of decency under the cloak of cleanliness, not under that of mystery ; let us get rid of incitements to curiosity by showing disgust, without disguising too much the plan of Providence, so as not to provoke inquisitiveness, nor arouse exaggerated suspicion, temptation or shame in the young hearts entrusted to us."

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instruction should be given by the mother, freely and naturally, in answer to the child's questions. The teacher should broach the subject through lessons on science, hygiene and morals.

If this instruction has to be organised in the schools, as is done in the United States, it is because the parents are not prepared for the task. We have already mentioned the establishment of schools for employers; schools for parents, which exist in California, are no less necessary. Puericulture is already taught in the majority of girls' schools; but this is only a small part of that which parents should know on the subject of the development of a child's health and personality. As Dr. Sophonisba Breckinridge, Dean of the Faculty of Social Science at the University of Chicago, has caustically written, our social system too often pays the father in such a manner that he cannot support his children, and educates the mother so badly that she cannot rear them.

Training in social matters remains neglected. Is it not paradoxical that men can become barristers or magistrates without knowing the biological and social causes of criminality, that without any social training they can enter the Church, the teaching profession, journalism, public offices and even insurance, assistance and public health services?

At present, the clergy, doctors, hygienists, judges, lawyers, teachers and manufacturers have each their own conception of life, which is of the professional order. Life will not be harmonised, nor social progress be assured, till the day when they will meet on common ground—the social field.

Knowledge of domestic economy, by a strange paradox, remains the privilege of a minority. It is still far from being adapted to practical requirements and extended to the vast domain of domestic life. A few lessons in needlework, dressmaking, and kitchenwork are not enough. Women must learn to draw up an adequate and well-balanced budget, to complete their education as purchasers and consumers, to economise in effort, to regulate the use of their time, to recognise the facilities offered by co-operative societies, private agencies and public institutions. In short, they must become familiar with the organisation and management of the home.

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It is in the United States that this teaching is most widely understood and most completely developed. The Federal Ministry of Agriculture and the departments of Agriculture of the different States organise travelling exhibits, meetings, circuits of instructors, and distribute millions of pamphlets which sometimes treat of such simple subjects as the removal of spots from clothes ; they make use of the Press, the cinema and the wireless.

The universities have supported this movement by creating faculties of domestic science, the teaching, research and publications of which are in no way inferior to those of other university departments, while maintaining their practical character. Trained stewards have been attached to hospitals, asylums, boarding-schools and prisons ; visitors in domestic economy teach at pre-natal clinics, social agencies, university extension services and schools ; lastly, dieticians, attached to hospitals and polyclinics, manage the kitchen, supply in-patients with an individual and suitable diet, and assist the persons attending the out-patient departments in any difficulty they find in preparing the diet recommended by the physician ; they also hold nutrition classes for children whose meals are scanty or badly regulated ; some make home visits. In many parts of the United States, the housewives apply to the domestic economy " clinic ", managed by a graduate of the School of Household Economics of the University. In this way the health, education, school attendance and appearance of the children are transformed, and order and harmony are restored to the family.

Nearly all the elementary, secondary and professional schools, as well as the teachers colleges, the university extension service, and evening classes teach domestic economy, not only to girls, but in an increasing proportion to boys. The Girl Guides make it a part of their programme. In the country, the teaching of rural household management is developed. Private agencies join with social workers in spreading the teaching of domestic economy ; they make a careful study of the standard budget which they recommend to the families under their care, without, however, imposing a uniformity contrary to individual taste or requirements.

In Germany, a large number of " Maidenheime " have been

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created—practical schools modelled on the boarding-school, for the domestic, hygienic and civic education of young girls. This idea originated with Bismarck, who visualised a great source of wealth and power for the nation in the preparation of future housewives and mothers. Domestic economy is also taught in most of the elementary schools, and in high schools for girls; also, in hospitals, homes and even in well-kept families, an actual apprenticeship is organised, ending in examinations for “companion”, and then for “mistress”. The associations of housewives have 300,000 members.

In Italy, the *Dopolavoro* (National Organisation for the use of leisure-time) gives courses on domestic economy.

In France, certain manufacturers, realising that domestic instruction will assure for their personnel a better standard of living—a guarantee of stability and efficiency—have agreed to pay full wages to those of their women workers who devote several weeks to instruction at the centres for domestic economy.

These examples are sufficient to show the extent, variety and advantages of these enterprises. The solution proposed in most countries is compulsory domestic instruction at the age when it is most likely to be profitable, i.e. 14 or 15 years or later. Scientific research and technical improvement should also be carried out in this domain. While long neglected and empirical, household work is now made less exhausting, quicker and cleaner through the discoveries of scientists, through the labour-saving devices manufactured by industry, and through scientific management. In some cities there is a central supply of heat, and hot and cold water; there are public laundries where housewives can do their own washing; the removal of dust is rendered easier and more effective by vacuum cleaners; the application of electricity to the kitchen and to the washing of plates and dishes economises time and labour. Need we go further, and favour the custom of taking the midday meal away from home? Circumstances render this necessary for the majority of officials, employees and workmen, at any rate in large industrial centres. We have already shown the advantages of this custom, and also considered under what conditions occupational work for the worker's wife is justified or even indicated (Chapter IX).

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In the middle and well-to-do classes, when the husband is away, the domestic management simplified, the children at nursery school or elementary school during the day, we cannot condemn the wife who finds in an outside occupation economic, intellectual and social freedom. Conjugal life is more harmonious when the wife, employed under satisfactory conditions, escapes from an idle life which impairs her health, atrophies her existence, and may corrupt her morals and those of her circle. In some families which have no need of a supplementary income, the wife nevertheless looks for regular occupation, thus giving evidence of a disinclination for an idle and artificial life. Many men regret this emancipation; not all women desire it, for it involves more activity, discipline and responsibility.

The problems of domestic economy extend still further; they touch upon the organisation of production and distribution, especially as regards food. Apart from co-operative societies and certain important enterprises of local or even national scope, nothing is done to regulate production and distribution in a way to make them less onerous, and utilise the resources of the country in the general interest. This is a subject which is still but little studied, and which merits the attention of economists. A few examples will demonstrate its range.

Under normal conditions the produce of each French farmer feeds nearly five men and five domestic animals, that of each fisherman one man only. Calves fed on milk and meal only yield in meat 9 per cent. of the food value which they have absorbed; fowls fed on corn cost thirty days' rations to supply food for two days; pigs yield at the most a quarter of the food value which they have received, so that the breeding of a million pigs costs as much as feeding 4 million men; milk furnishes in animal proteins 33 per cent. of the vegetable proteins consumed by the cow, while beef only yields 10 to 15 per cent. (Legendre). These data must be taken into consideration for the rational organisation of the production of food. They may some day become the basis of an international programme—the 100-year plan of Dr. Vaviloff, who proposed to limit the cultivation of every plant to the region which best suited it.

In many countries the collection, preservation and transport of

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food leave much to be desired, especially with regard to the quality of milk.¹ In spite of good organisation, the consumer suffers without profit for the producer. To remedy this defect the Soviet Republic has founded a nutrition institute in Moscow, where diets suited to different ages and different occupations are studied as factors of public health, efficiency and national economy. Under the direction of the food commissariat, 9,000 restaurants supply every day the principal meal for 15 million persons.²

It is surprising that occupational training has so few pupils. In most countries, in nine cases out of ten, men become agriculturists, artisans, or workmen without having received any technical education. Formerly it was the same with the medical profession. But this practice has become indefensible ; all forms of apprenticeship require theoretical and practical initiation methodically conducted. Such instruction should be obligatory in the same way as elementary education, and ought to include the principles of occupational hygiene and safety. On the other hand, the generalisation of occupational guidance would prevent many errors and miscalculations which cause repercussions throughout life. We have shown (Chapter IX) the role of the doctor in the occupational guidance and the medical inspection of apprentices ; it includes the application of individualised hygiene, based on the study of the physical, intellectual and moral constitution of the subject.

In the Soviet Republic the principle is maintained that every person, whatever his occupation, should attend courses of instruction enabling him to acquire greater proficiency and to rise in the scale of his trade. Promising pupils are maintained in the technical schools at the public expense ; if they were expected to support their parents, the latter receive an allowance. By this means a condition is approached in which occupational and social selection is based on merit. Technical education is often given in the industrial enterprise itself. It was at first confined to one

¹ The Italian Government has made the establishment of central milk stations obligatory in all the large towns.

² There exists in Berlin an International Association which studies the food supply and food preparation for the masses.

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branch of industry, but this rule was soon recognised as too narrow in conception.

Medical education requires some further consideration. Directed almost exclusively to diagnosis and treatment, and still destitute of a psychological and social view-point, it does not correspond to everyday requirements. Clinical teaching rarely deals with common ailments, or with the study of the beginnings of disease as inculcated at the Institute founded at St. Andrews by the great heart specialist Sir James Mackenzie.

It would be more advantageous to select from time to time out-patients as subjects for teaching, make an analysis based both on medical and social observation, and to follow the example of some universities which have instituted clinics for hygiene and clinics for social service, which take students to the patients' homes.

As Sir George Newman has stated with his unique authority, four kinds of knowledge are indispensable for the student :

first, he requires to have a standard of physiological health and capacity, attained by personal hygiene of body and mind ; secondly, a fairly comprehensive grasp of the etiology of disease, whether infectious or non-infectious, is essential to any scientific understanding of prevention ; thirdly, to understand preventive medicine the practitioner must be able to appreciate the place and purpose of sanitation and a hygienic environment , lastly, it is necessary to be able to evaluate the effect upon health and disease of social evolution. What has been the medical effect of the industrial revolution, or the introduction of steam ? of elementary education and religious liberty ? of the improvement of roads and transport ? of the rise and fall of wages and the cost of living ? of the importation of meat and corn ? of the growth of towns ?

It is not an addition to the medical curriculum which is necessary, but a change in its spirit ; the idea of prevention should go side by side with that of cure. The place of hygiene is in clinical medicine, of which it forms an integral part. The teaching of hygiene also requires to be expanded and rendered more life-like by visiting of institutions and social agencies. In this way the student will accustom himself to look upon prevention as the essential object of medicine. When these reforms are realised,

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the Faculty of Medicine may be called the Faculty of Health, as visualised by Sir Robert Philip.¹

On their part, hygienists would receive theoretical and practical training in the University Schools of Public Health. Social workers would be prepared in training schools for social work, nurses and midwives in special schools where the social side of their calling would receive special attention. It is advantageous for schools of social service to be attached to schools of social sciences ; schools of public health, midwifery and nursing to medical schools. For practical training, they should be closely connected with health and social services and agencies.

For those who do not obtain full satisfaction in their work, avocations are the principal object and reward of existence ; the mentality of human beings is tested in their employment ; they ought to be either educative or recreative. We cannot expect commercial enterprises to cater for these needs. Too often they offer only sophisticated pleasures ; the professional athletes invade the sports grounds ; newspapers, books, plays, and films speculate on our lower instincts. This is not the case with public institutions and private agencies whose object is to serve the general interest ; they promote that which is elevating, not that which pays. It is interesting to compare the cinema, which is too often intent on profit,² and broadcasting, which is generally free from this evil, and therefore able to follow its true mission. The B.B.C. furnishes the best example in this respect.³

Compulsory elementary education, the spread of secondary

¹ The recent report of the Commission on medical education in the United States formulates the same recommendations : to imbue teaching with the idea that diseases must be prevented, to emphasise the psychological aspect of medicine, to look upon medicine as a social institution, and treat the man and not the disease. Similar ideas have been promulgated by the Health Organisation of the League of Nations. The physician should be " a trustee of human health " (Tandler) ; " Medicine has for a long time past concentrated on the art of curing disease. It is time for it to devote its chief attention to the art of preserving, or even creating health " (Burnet).

² At Oslo the cinemas belong to the municipality, and serve education without austerity.

³ It is estimated that 200 million people listen to the wireless. In Denmark every other family has a set.

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education, the desire for adult education expressed by the necessity of expanding this education if our object is to make civilisation a reality, require a wide action in the domain of leisure. Reduction of the hours of work renders this task still more urgent, although we should have no illusions as to the actual extent of leisure in the wage-earning classes. In Germany, during the year 1927, the working day for 200,000 adolescents was $11\frac{1}{2}$ hours in towns and $12\frac{1}{2}$ hours in the country, including the journey from home to workshop and the midday rest (Mewes). It is apparent that the six-hour day, to which we shall perhaps come, will not allow of excessive liberty.

The rational use of leisure-time, according to Albert Thomas, requires the following conditions :

1. A standard of wages sufficient to prevent the necessity for the worker to seek other employment, and to enable him to enjoy his leisure without undue fatigue and anxiety ;
2. Education which leads him to desire intellectual enjoyment ;
3. A housing policy which provides him with a comfortable home ;
4. A transportation service which avoids loss of time. Leisure may be daily, weekly or annual. The system of a week's holiday with leave pay, which applies to about half the wage-earners in western Europe, has proved particularly beneficial. We may also mention the remarkable organisation, in the Soviet Republic, of rest-houses, where everyone can spend a fortnight every year.

We must also distinguish between family, group and children's leisure-time.

Family recreation is the most neglected. Scanty and uncomfortable housing drives the family to seek recreation outside ; the overworked mother, ignorant of how to make the home attractive, cannot retain her husband and sometimes not even her children. In many families the real reason of disharmony is an absence of common tastes, interests, thoughts, and sentiments between the father and the mother on the one hand, and between the parents and the children on the other hand. This may lead to disastrous consequences for the health, morals and domestic economy of the household.

Such a situation is to be met by general education—the neces-

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sary basis of all social construction—by domestic instruction, and by lessons in singing, music, drawing and the applied arts, and even in the 'performance of odd jobs'.

Attempts should be made in the renovation, furnishing and decoration of dwellings. Competitions, exhibitions and the construction of model dwellings will facilitate the realisation of this task. The province of Hainaut in Belgium sells artistic engravings and mouldings, which are cheaper than the ugly chromolithographs and ridiculous sculptures found in most workmen's dwellings.

Lastly, whenever possible, every house should have its own flower garden and kitchen garden—if necessary at a distance from the house in the form of an allotment—and its small breeding-place for rabbits and poultry. Here again, horticultural exhibitions, breeding farms, lectures, exhibitions and supervisory services must be utilised.

Group recreation consists in physical education, sports, games, dancing and walks (gymnasiums, swimming-baths, stadiums, playgrounds, parks and dance halls); in artistic education (organised visits to museums, picture galleries, concerts and popular dances, artistic films, choirs, bands, theatrical clubs, art exhibitions, pageants, fêtes); in intellectual education (lectures, adult education associations, debating societies, libraries, educational films, wireless talks, holiday schools and camps, excursions).

Children's recreation is facilitated by the extension of elementary education, which is compulsory in some countries up to the age of 15, 16 or even 18, in combination with occupational and domestic apprenticeship. This measure is advocated by teachers as well as by hygienists, as they can then follow up health welfare till the age of adolescence, with the aid of school medical inspection. For the leisure hours of youth it is advantageous to make use of school facilities. Every country should possess abundant literature suitable for the different ages of childhood and youth; in this respect the Latin countries are not well provided. For the development of the health and character of the child, playgrounds in charge of instructors are necessary; these should be divided into sections reserved for very young children, those of medium and those of older age.

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The grouping of the young is important, with regard to their physical, moral, civic and social development. Based on a sound knowledge of the psychology of childhood, the Boy Scouts organisation satisfies the ideals of sport, team-work, emulation and adventure; it completes the family and school education. The Junior Red Cross supervises training in health habits and mutual aid, as well as the development of a civic sense and international good-will.

The Levente in Hungary, the Balillas in Italy, the Hitler Jugend in Germany, and the Pioneers in the Soviet Republic add military training. The Balillas have their own medical service, their mutual benefit societies, their buildings containing assembly rooms, libraries and cinemas. They are directed by special instructors and organise excursions. Hostels for young hikers, of which there are about 2,000 in Germany, are beginning to spread in other countries. In Anglo-Saxon countries, children's clubs play an important part.

The problem of the utilisation of leisure and of civic organisation is as urgent in the country as in the towns. The urban population suffers from overcrowding, the rural population from isolation. The progress of modern technology, the telephone, wireless, automobiles, cinemas and rapid transport will stimulate the intellectual life of villages, in which teachers and medical men have an important part to play. The "Granges" in America, and similar institutions in England, Denmark and elsewhere, are directed to the support of material interests (co-operative associations for purchase, sale and insurance, agricultural exhibitions and meetings, etc.), and at the same time to intellectual and civic development. Associations of alumni, of parents, or of parents and teachers have the same object in view.

The organisation of leisure hours may be the work of public authorities, of private enterprise, of employers or of the interested parties themselves.¹ This is the case in France, where employers and the Church have done much in this field. The National Federation of Consumers Co-operative Societies has taken a

¹ The International Labour Office and the International Institute of Intellectual Co-operation are studying these problems, for the discussion of which International Congresses have met.

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prominent part in the activity of the Committee of Leisure, which owes so much to Albert Thomas. This Committee has created eight offices for culture centres, hostels and holiday camps, travel and excursions, horticultural pursuits, home decoration, photography, theatrical performances and festivals, and sports. Local committees, to the number of about 120, carry out this work.

In Germany, the Association of free People's theatres had grouped those who wished to attend performances, so as to reduce the risk of loss for the directors, and lower the price of seats for the working class. Trades Unions and leagues of popular culture had increased their educational efforts. The present government has created a national organisation for the use of leisure-time under the name of "Force through Joy."

In England, rural associations formed by women have revived popular dances, songs and arts, organised social gatherings and circles for needlework and cooking, and formed centres where social gatherings, lectures, concerts and theatrical performances are held. Certain groups listen to the wireless in the libraries or village institutes and then discuss it under the direction of a leader.

In Belgium, the province of Hainaut has established, since 1919, a system of grants for the organisation of leisure, with instructors, literature, classes, lectures, exhibitions, meetings, competitions, libraries, collections of blocks and films, breeding farms, standard gardens, etc. This programme includes housing, gardening, breeding, physical education, and artistic, intellectual and moral education.

In Italy, the National Organisation for the use of leisure-time (*Dopolavoro*), established by law in 1925, extends its activity in the same direction; it also promotes social service in industry (first aid, medical treatment, assistance, insurance, canteens, shower-baths, wash-houses). This national organisation acts by propaganda, inspection, advice and grants: it provides films, engages lecturers and organises itinerant courses of agriculture; its "chariots of Thespis" are theatrical companies which circulate throughout the country¹; it secures reduced prices for

¹ In Spain also, there is the "Barraca", a travelling theatre the actors of which are students.

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travelling, for entrance into museums, for the purchase of books, etc., and for medical treatment. A special section is devoted to women's leisure. The 17,800 local branches are created by the employers as annexes to their enterprises, but there are also communal centres in the cities and villages. They are provided with a restaurant, library, meeting-room, gymnasium, playground and shower-baths. Nearly two million men and women spend their leisure-time there, both in town and country, in 6,235 communes out of the 7,249 existing in Italy; 6,500 institutions affiliated to the Dopolavoro are concerned with physical education, sports and games; 5,900 with excursions, 4,000 with assistance; all of them with instruction in arts, 500 with occupational training; 3,000 have a library. In addition there is often a service of judicial and administrative consultations, which represents a true people's secretariat.

In the United States, the National Playground Association, afterwards changed to the National Recreation Association, has fulfilled its function so well that 764 municipalities now bear the cost of 90 per cent. of the budget of organised leisure (38 million dollars), especially as regards the playgrounds; 25,000 instructors (male and female) are attached to these institutions, which also give instruction in basket-making, modelling and toy-making. They even have golf-links, the use of which is gratuitous. The extension service of the Federal Department of Agriculture, in co-operation with the schools of agriculture, provides for leisure hours in 9,000 villages. It is estimated that 8 million people camp out every year. In towns and centres for excursions, families of moderate means can, for a dollar a night, garage their cars and occupy a separate cottage provided with kitchen and water supply; these are the tourist parks. In the national parks, which are vast stores of natural beauty, museums are fitted up and pathways made to demonstrate the flora, fauna and minerals of the region. The Community Councils, federations of families and social forces, arrange a programme which embraces health, teaching and recreation, and enjoy the collaboration of the civic clubs, councils of social agencies, women's organisations, the Y.M.C.A. and Y.W.C.A. and similar institutions founded by the Catholics

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and Jews, young people's clubs, and even chambers of commerce.

Among the organisations destined for leisure, two categories merit special mention: the teaching centres and the social centres.

The former do not confine themselves to courses of lectures, they devote much attention to study circles and to practical instruction requiring personal work on the part of the students. By alliance with the co-operative unions, the trades unions and the university extension system, the Workers' Educational Association (the nucleus of the International Federation for Adult Education), provides teaching which reaches the standard of higher education; every year 40,000 English workmen choose for themselves the subject in which they desire to be taught.

This movement now extends to the rural population, in order to realise the object of the English Commission for the study of adult education; "Education is not to be regarded as a luxury to be enjoyed by a few exceptional individuals, nor as a task limited for everyone to a short period. The education of adults is a universal and permanent national necessity". It should be an adaptation of the individual (Peers).

Denmark has perhaps best fulfilled this object. The People's High Schools, founded by an apostle of national culture and tradition, Bishop Grundtvig, are boarding-schools attended during six months by young men and women from the country, about the age of 20. Residing with the teachers, engaged in agricultural work, cultivating poetry, singing, dancing and popular arts, they follow a course of instruction, which is mainly directed to the development of the moral and social sense and the improvement of personality. If Denmark was able to survive the crisis which followed the war in Schleswig; if, near the end of the nineteenth century, it succeeded in a few years in transforming its national economy, threatened by overseas competition in corn; if co-operation is so widespread and the social standard so high, this country owes it largely to the People's High Schools, through which pass a large proportion of young people, and sometimes adults. Similar schools have

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been established in Sweden, Norway, Germany and Yugoslavia.

We must also mention the Labour Academies and the Workers' Universities in Germany, Austria and Poland; the workmen's colleges of the English universities; the vacation courses of certain English and American universities, in which workers of both sexes enjoy intellectual pleasures, liberty and comfort appropriate to student life; the Chautauquas, holiday camps, which combine sports, music and instruction; the university extension courses, which, originating in England, have been considerably developed in the United States; courses by correspondence or by gramophone records; courses by wireless, which in Switzerland are utilised for the training of apprentices.

Public libraries only fulfil their function when they are open at all hours and comfortably furnished; the choice of books, reviews and journals should correspond to the inclinations and needs of the people, and the reader should receive advice and guidance. In the children's libraries, direct access is allowed to the bookshelves; the furniture is devised according to the size at the various ages. Special schools train librarians who collaborate with the teaching staff. In the United States, books are delivered on the same day in response to telephone messages. In rural regions boxes of books are circulated. On leaving the factory workmen are offered a choice of books on loan. In the same way the museums attract and instruct the public; some of them loan pictures and drawings to the educational and social institutions.

A new form of instruction has been created by the German museum in Munich, the museum of hygiene in Dresden, the social museums of Dusseldorf and Vienna, and the Soviet museums. For this form of instruction a technique has been elaborated by means of which the visitor can put in action models and machines and test apparatus, in this way obtaining practical explanations of various phenomena. At the museum in Dusseldorf, the different aspects of the problem of rationalisation are explained in one room, and those of population in another room, so that even the uneducated can understand these complex questions. At Munich, a group of rooms is devoted to an

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explanation of physics, which brings this science within the realm of the layman.

There are Social Centres for women only (Women's Institutes, Working-women's clubs); for political groups (People's Institutes); for members of an association (Trades Union or co-operative clubs) or for the general public. They may have a humanitarian object (Homes and Hostels, Social Centres, Social Settlements), or a religious object (Young People's Guilds).¹ The object of Civic Centres, on the other hand, is to tighten the bonds between all the inhabitants of a village, town, or neighbourhood (Recreational Centres, Civic Clubs, and Civic Centres).

Among the features which require attention, the first is the use of the school after school hours. This is a practical scheme, since every village and in the cities every ward has its school; it is also an economical one, since the school building contains rooms suitable for meetings, and often a projection apparatus, a piano, wireless, a library, a gymnasium, sometimes workshops connected with the school, as well as a playground and arrangements for sports. The scheme also encourages meetings between teachers and parents. Private initiative can transform the school into an intellectual club or a civic centre. The public authorities assist by means of grants, especially for the teachers and instructors whose daily presence is indispensable.²

Recreation centres, on the other hand, usually originate from a playground in a park. By natural extension a library and meeting-room are added, which may be used for lectures, dancing, theatre or cinema. A committee with paid monitors can provide for the leisure hours of a whole district. Admirable recreation centres are found in the United States and in Japan. We have already mentioned how Scott Williamson and Pearse

¹ As far back as 1709, J. B. de la Salle directed a Young People's Guild in Paris. In England, Workmen's Clubs and Institutes date from 1862, and in France from 1870.

² This utilisation of the school is common in the United States and Mexico. In the latter country the school is called Casa del Pueblo (People's Club). Inspectors scour the country to urge their use by adults. Teachers go through a month's training to fit themselves for their new task.

combined a Health Centre, Social Centre and Recreation Centre at Peckham.

The most complete organisation is that of the sixty parks for rest and culture, in the large towns of the Soviet Republic, which originated from the suggestion of a workman. At the park in Moscow, which extends over 750 acres, 200,000 daily attendances have been registered. On the so-called leisure day (one out of six), many people stay there from morning to night. They are offered at the entrance medical and legal advice: at the medical clinic visitors are instructed as to the most suitable physical exercises for their condition; at the legal consultation they are freed from any anxiety as to their personal affairs. The park is fitted for gymnastics and sports, including swimming and rowing; singing and dancing are performed in the open air; there are also museums, a library, study clubs, a solarium, a circus, a cinema, a theatre, a music hall, a zoological and botanical garden, and restaurants which do not serve alcoholic drinks. For small children there is a day nursery, and playgrounds; for older children, a small museum where they can handle the objects exposed, a recreation class for drawing, modeling, manual work, games, singing and dancing; they also have a swimming-bath, shower-baths, a playground and a canteen. Instructors (male and female), aided by 3,000 voluntary helpers, are at the disposal of the visitors. A special park has been laid out for convalescents and persons on a restricted diet.

Social settlements are situated in populated quarters. Philanthropists not only give their help but reside there themselves, in order to study the needs of the people, to aid them in difficulties and offer them the advantages of social contact.¹ The settlement includes a library, a meeting-room, a restaurant, arrangements for study, art, sport and excursions, sometimes a playground, dispensaries, a day nursery and kindergarten; debates are organised and classes for general knowledge, domestic and occupational work, also social gatherings, concerts and theatrical performances. Legal and medical advice is given. The settlement is the home of those who have no housing worthy

¹ Saint-Simon and Fourier were the first to conceive the idea of Settlements.

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of the name ; it is the parlour where the isolated find company. Toynbee Hall, established in London in 1884 by Canon Barnett and his wife, Hull House in Chicago, founded by Jane Addams in 1889, and the Henry Street Settlement in New York, opened by Lillian D. Wald in 1893, are the most celebrated of these settlements, which have now extended even to the Far East. As activity centres for the masses, as laboratories for social study and social training, as nurseries of philanthropic works, settlements have transformed the life and even the appearance of the neighbourhood in which they are established.

The Civic Centre resembles the Settlements, but aims at serving the whole population, and not only the poor and the friendless. At Trazegnies, a mining city of 9,000 inhabitants in Belgium, this institution contains rooms for meetings, concerts, cinematograph and theatrical performances, a restaurant, a library and children's library, a museum, rooms for drawing, music and manual work, a gymnasium, baths, a sports ground, a Health Centre (with infant clinics, anti-tuberculous and anti-venereal dispensaries, an inoculation service and a district nurse's service), a savings bank and a post office. Near these are the laboratories, workshops, greenhouses and gardens of the technical school.

Lastly, we must mention the organisation of clubs by the Soviet Republic. In the villages, a house is transformed into a meeting-place. It provides pamphlets, journals, reviews, books, wireless, often a restaurant, and an assembly room. In the towns, the clubs are annexes to the large factories and administrative services ; they contain shower-baths, gymnasiums, stadiums, solariums, restaurants, concert halls, theatres, cinemas, and libraries ; they house dramatic, musical and educational circles, and give courses in domestic economy, technical education, science and languages. There is also a section for children.

By this means the manual or intellectual worker finds near his work the whole gamut of recreational, educational and athletic distractions.

In conclusion, the utilisation of leisure should assume a collective form and be inspired by the civic sense, in order to avoid

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being looked upon as a form of compulsory pleasure, as a slur on the dignity of those whom it is desired to elevate.

This task is easy in the garden-cities which are already the realisation of a common ideal and which, better than any other organisation, prepare for and appeal to the civic conscience. Excellent French examples are the thirty-two garden-cities of the Northern Railway Company, created by Raoul Dautry, and the twenty garden-cities of the Public Housing Office of the department of the Seine, directed by Henri Sellier.

To attain success it is necessary to act without any view to propaganda or patronage, to secure the co-operation of working-class leaders and that of the teachers, who are prepared for this task by the social circle in which they are recruited, by their vocation, their training and experience, by the relations which they have established with the pupils and their parents. In short, co-ordination is necessary in all domains; in familial leisure and group leisure; in education, recreation, and sports.

The worker, formerly resigned to mediocrity in material and intellectual life, is already stimulated by the leaven of social reforms and compulsory education. The utilisation of leisure will complete this redemption.

It will restore that beauty of which the machine age has deprived us, and which has remained so alive in the Far East, where houses, furniture, clothing, and even utensils manufactured by the thousand, are imbued with harmonious grace. Everyone there seems to possess the talent of the craftsman, and even the artistic sense. We often know no more than to buy passive pleasure at a theatre or race-course or sports ground. Chinese, Japanese, Malays create their pleasures for themselves, and delight in nature, meditation and simple joys. This daily cult of beauty, this profound understanding of life, are the great lessons taught us by these peoples of a high and ancient civilisation.

CHAPTER XIV

HUMAN ECONOMICS

By the aid of science, man has escaped the influence of scourges which were long believed to be inevitable. Leprosy, bubonic plague, cholera, yellow fever, smallpox, typhus and recurrent fever no longer spread over Europe. Infancy is less and less subject to disease: diet and sunshine will conquer rickets, inoculation will counteract diphtheria, scarlatina, whooping-cough, measles, and perhaps, thanks to the discovery of Calmette and Guérin, even tuberculosis. While anticipating general immunisation of the new-born, the campaign against tuberculosis is conducted so vigorously, that in some countries, especially Denmark and the United States, the sanatoriums and tuberculosis hospitals are becoming depopulated. In Sweden and Denmark fresh cases of syphilis are becoming rare. The Belgian legislation on alcohol, which prohibits the retail sale of spirits, but not that of beer and wine, has resulted in the closing down of half the drinking places; the settlements for vagrants were cleared before the crisis, and the mental hospitals contain hardly any alcoholics.

When well conducted, the efforts of hygienists lead to success in a comparatively short time. Health is purchasable. We can buy human lives. Each country, within certain limits, decides its own mortality.

The average duration of life, which in ancient times appears to have been about 25 years, and which even now hardly exceeds this figure in India, China and Egypt, has risen to more than 60 years in the United States, Australia, Denmark, Sweden, Holland and New Zealand. It is only two centuries since one infant out of three died before it was a year old; the situation is hardly better now in China and equatorial Africa, but in twenty-six

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countries (out of fifty-five possessing vital statistics) only one infant in ten, or even a lower proportion, now dies in the first year, and in New Zealand the mortality is only one in thirty-one.

By living longer and keeping more vigorous, we escape infirmities which were considered inevitable and avoid troubles which were formerly common. There are fewer blind, crippled and incurable among us, and these are now trained in occupations which restore to them the enjoyment and profit of work.

The improvement of economic conditions has been no less beneficial. The history of mankind is that of poverty. At the foot of the Acropolis, around the Forum, the temple of Solomon, the Egyptian and Babylonian palaces lived a crowded and miserable population. Till the middle of the nineteenth century neither the peasant nor the citizen were sure of their daily bread. At the present day whole nations have become so rich that all could be properly fed, lodged, clothed and taught.

The occupational conditions of men have become profoundly modified. We read in Ramazzini the state of existence of miners in 1700; every morning a "penitent" was the first to descend the pit with a lighted torch to cause an explosion of fire-damp which might have accumulated.¹

Even in the nineteenth century, in all factories, a thirteen-hour day, without rest on Sunday, was the rule. Let us recall the cruel abuses resulting from woman's and child labour, the deadly effects of phosphorus, mercury and lead poisoning, the ravages of scurvy and epidemics of ophthalmia on board ship.

Intellectual conditions have undergone a still greater transformation. The nineteenth century will be known as the age of schools. Compulsory elementary education, facilities for secondary and university education, diffusion of occupational and domestic instruction, evening classes, public libraries, journals, cheap editions of books, the cinema and wireless are beginning to enlarge the horizon of classes of people who were formerly doomed to ignorance and prejudice.

The civil status of men has become incomparably raised. Legal privileges are no longer accorded to rank, fortune or position.

¹ The "penitent" was either an old workman who could not earn a livelihood in any other way, a repentant criminal, or a desperado.

Following a new inspiration a number of laws have substituted fact for theory, social economy for abstract principles, public order for legal ideas, general directions for rigid prescriptions (Lambert). This "judicial individualisation of private rights" (Gény) corresponds, as M. Georges Cornil has remarked, to the individualisation of penal treatment. It aims less at avenging society than at protecting it; instead of punishing the delinquent, it prefers to render him harmless, and if possible useful to society.¹

Our moral ideas have not escaped this general advance. When classic antiquity, so brilliant in art and ideas, is revealed to us in its daily reality, it appears to us cruel and even revolting.²

In more recent times, let us read the terms in which Madame de Sévigné approved of the terrible repression following a harmless riot.³ Let us visit the Salpêtrière and see the narrow dungeons where the insane were chained till Pinel, at the time of the French Revolution led them to the light of day. Let us glance through the English historians who relate how, till the nineteenth century,

¹ At Paris, in 1826, a woman was put in the pillory and branded with a hot iron. A child of 13 was hanged at Maidstone in 1831. Two years later a child of 9 was condemned to death for stealing two-pennyworth of paints; but the sentence was not carried out.

² A slave summoned as a witness (not a culprit) was subjected to torture, from which was derived the word martyr, which originally signified witness. In a different order of ideas, we may remember that if a father at the birth of his child did not take it in his arms, the infant was exposed in a desert place; this practice was so common that there was a trade in baskets specially made for the purpose. Many other customs might be cited to give a true idea of ancient morality.

³ 16th of October 1675—The Duke of Chaulnes is at Rennes with 4,000 men. The rope will dangle.

30th October 1675—A tax of 100,000 crowns has been imposed on the citizens, and if it is not found within twenty-four hours, it will be doubled and exacted by the soldiers; all the inhabitants of a large street have been driven away (in Rennes) and anybody who would open his door to them would be put to death, so that we see all these unfortunates, old people, women in labour and children, wandering in tears or leaving this town without knowing where to go. Yesterday they broke on the wheel a fiddler who had begun the dance when stamped paper had been stolen; after death he was quartered, and the four quarters exposed in the four corners of the town, like those of Josseran at Aix. They have captured sixty citizens, and begun their punishment to-morrow. This province is a good example for the others, especially to respect the Governors and the Governesses, to speak no evil of them, and not to throw stones in their garden.

fashionable people went to excite the lunatics behind their bars, and crowded before the Bedlam pillory to see the insane flogged. Let us remember that the convention commanding belligerents to respect the wounded dates from 1864, and that it is only to-day that war has been declared illegal. Let us recall the entire towns ravaged at the point of the sword, the religious persecutions, the starving peasants snatching from the wolves the carcasses of horses in the Palatinate, pillaged twenty-eight times in the course of the thirty years' war; 25,000 Christians massacred in Chios and 45,000 sold as slaves a century ago. Let us compare colonisation fifty years ago with what it is to-day.

Should we now see the leader of an expeditionary force give orders similar to those of General Rochambeau (son of the celebrated Marshal), in his campaign against Toussaint l'Ouverture at St. Domingo: "I am sending you 28 watch-dogs. No rations or expense for their feeding will be allowed. You must give them negroes to eat" (Michel Vaucaire). Should we now see, as happened 150 years ago, one sovereign sell soldiers to another, and urge their chief to get as many of them killed as possible.¹

¹ The *Journal des Débats* (3rd March 1926) writes: The *Frankfort Gazette* of February 27th publishes an incredible document which the reader might easily mistake for a grim joke. Nevertheless it is authentic. It is a letter addressed by the landgrave of Hesse-Cassel to the commander of the Hessian troops in America on February 8th 1777. We know that this ruler sold his subjects to England as "cannon-fodder". Here is the text of the letter:

"Baron Hohendorff: I have received your letter of Dec. 27th of last year on my return to Rome. I have learnt from it with the greatest satisfaction the courage displayed by my troops at Trenton, and you can imagine my joy on reading that, of the 1,950 Hessians engaged, only 300 returned. Therefore, exactly 1,650 of them have fallen, and I cannot praise too highly your prudence in sending the exact list to my attorneys in London. This precaution was all the more necessary, as the list sent me by the English minister accounted for only 1,455 killed. This would cause me a loss of 160,050 guildens. According to the account of the Lord of the Treasury, he will send me only 483,450 gulden instead of 653,000. The British court claim that there are 100 wounded for whom it does not owe the price of death. Let me remind you, on this subject, that of the 300 Lacedæmonians who defended the pass of Thermopylæ, none of them escaped.

"I should be happy to say as much for my brave Hessians. Tell Major Mindorf that I am extremely dissatisfied with his conduct. He has saved his battalion! During the whole campaign he has only lost 10 men."

When we build a theatre, do we test its soundness by attracting a crowd of people to a free performance, as was done by the architect who rebuilt the Paris Opera in 1781 ? (Cain.)

Man has accustomed himself to respect human dignity. To say the least, he no longer recognises the power to reduce his fellow beings to slavery, or to sell, torture or tyrannise over them.

In former times the masses were only a reservoir of men and money. Life and suffering were of little account. To-day we multiply our efforts not only to render life more endurable, but also to raise it and make it fuller for everyone.

In face of this collective amelioration, it may be asked whether man is individually stronger, more intelligent and better than he was two thousand years ago.

He is not stronger, but while the domestication of animals doubled the strength at his disposal, the machine has increased it a hundredfold. He is not more intelligent, but he has acquired so much knowledge that his whole conception of the world has changed. He is no better in the sense that if placed under exceptional conditions he would perhaps revert to the brutality of former times ; moreover, we see a survival of what Walter Page called "contemporary ancestors", persons who do not belong to our era. Nevertheless, the majority of men, in ordinary circumstances turn with horror from acts which were formerly admitted and even approved. The foundation of human nature has hardly changed, but the licence given to evil passions has been limited both by law and by custom ; manifesting themselves less fully and less openly, these passions can no longer be developed and asserted to the same extent ; they must, however little it may be, yield and retreat. Is this hypocrisy, merely an outward form of progress ? To affirm that this is the case, it would be necessary to show that the majority of men suffer from these limitations, that we regret being unable to flog our servants or kill the wounded on the battlefield. If, on the contrary, we are revolted by these acts, have we not on the whole gained in morality, thanks to the development of the social sense and an increasing respect for human personality ? "We are, to a certain extent, what we make ourselves, and we are continually creating ourselves" (Bergson).

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Man now knows that his condition can be improved, that this improvement extends eventually to human nature, and that it leads in its turn to further progress. But these victories must not lead us to forget our weaknesses. The future will not be more indulgent to our times than we are to past eras.

Entire continents groan under the burden of poverty and disease ; for many human beings life is narrow and sordid ; technique serves, but also dominates us ; parcelled out and done under compulsion, work is deprived of its joy ; here and there barbarous instincts are aroused ; 30 million unemployed denounce our incapacity ; much unjust suffering calls in vain for pity ; the spectre of war is not yet laid.

What are we to conclude from these inconsistencies ? Is our task a failure, or is it only incomplete ?

Progress is fed from two sources : science which has given us power ; solidarity which enables us to distribute it. Science advances while we have no power to check it. On the other hand, twenty centuries have elapsed since Socrates, Jesus and Mahomet proclaimed the dignity of human beings ; yet charity, fraternity and good-will have advanced but slowly. It is this delay, and not the advancement of science, which paralyses and sometimes misleads us.¹

Why have machines and inventions given us implements for murder, new menaces and general penury ? Why are prosperity, health and culture so unequally shared ? It is because solidarity has not conquered individual egoism, class egoism or national egoism.

But this is where egoism shows itself to be deceptive. Driven to its extreme limits, the rule of competition and profit has broken down. In the long run individual advantage is seen to be inseparable from general welfare. It is evident, all things considered, that war is of little benefit to the conqueror, and that poverty enriches no one. Solidarity is beginning to recruit its forces from the opposite camp.

Yielding to this voice, nations appeal to the law to remedy the abuses of their economic system. Australia and New Zealand have been the pioneers of a social capitalism for which England

¹ Justice does not keep pace with science (Langevin).

has paved the way in Europe, and which Switzerland, Holland and the Scandinavian countries are striving to bring to integral realisation.

Italy, followed by Austria and Portugal, has instituted a corporative regime which subordinates individual interests to national discipline. The United States, Mexico, Turkey and Germany have introduced a similar system by different methods. The Soviet Republic has chosen the path of State Socialism.

Under contradictory aspects, these reforms aim at the same object: the pursuit of the common welfare, the organisation of human existence and the protection of life.

Invaders from within (Élie Faure)—disease and poverty—are even more cruel than invaders from without, for their action is permanent. In four years war destroyed a million and a half Frenchmen, but six years of peace have resulted in an equal destruction of lives which ought to have been saved.¹ The army of civilian invalids is as great as that of those crippled by war.

Disease absorbs 15 per cent. of the national revenue. We lose still more by defects in general, occupational and domestic education, by the absence of a rational organisation for production and distribution, by errors in industrial management, by our slowness in developing town planning and the organisation of leisure, and by everything that is wanting in child protection and in assistance.

To counteract these losses, to remedy these defects, to re-organise collective life and public services in a social sense, would mean an incomparable increase in our resources. We should then see that social expenditure forms the safest and most remunerative long-dated investment.

In order to obtain these riches, both material and spiritual, it would be necessary to utilise an increasing proportion of the national revenue, and consequently reduce that allotted to military expenses, for the debts left by past wars and the preparation for future wars absorb three-quarters of State budgets. Moral and material disarmament would be not only a great spiritual victory, but also the means of endowing social progress. To

¹ With the Dutch death-rate France would be saved 260,000 deaths every year. This is the population of Bordeaux.

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realise this we can no longer be contented with fragmentary measures. The time has come to draw up a complete programme, and it is here that sociological medicine brings the whole weight of its influence to bear on the problem.

Originated by minds in advance of their time, prepared by generations of workers who patiently collected the materials for it, sociological medicine now finds a world ready to receive it, as soon as it will have become systematised.

Its fundamental study is the parallelism of social and biological inequality. At all ages of life, at all times and in all countries, physical and intellectual development follow, on the whole, the curve of social opportunity. Descending successively from the independent class to the middle class, the skilled workers and to the labourers, we find that disease and death gather an increasing harvest of human lives.

For this inequality are we to blame heredity or environment ? It does not appear at birth, but a short time afterwards, and only when the environment is unfavourable. Heredity, which is so important in individual destiny, plays only an accessory part in the biological differences which distinguish the social strata of society from one another. If the working class is, on the whole, stunted in body and mind in comparison to the independent class, this is due to the conditions of work, to housing conditions, poverty, lack of curative and preventive medical care, and defects in instruction and education. This biological inferiority of a large part of the population not only offends our sense of humanity, but compromises family life, social relations and intellectual culture, and weakens national economy. To counteract this influence, sociological medicine, which is closely allied to hygiene and social policy, aims at the protection and the development of human personality, considered both from its economic and spiritual values.

Since a human being declines or becomes perverted if overwork, poverty, or neglect drag him below the level of an existence compatible with the maintenance of his physical and moral health, *the first rule is to ensure that no one at no time shall be wanting in this necessary minimum.* Sociological medicine demands the

provision, by *collective measures*, of favourable labour conditions, good housing, decent wages, generalised insurance, sanitary, technical and educational services, to be completed by the *individualised action* of medical and social case work.

General measures are preventive and constructive. Individual aid, which was at first palliative, now tends to assume a curative, or still better, a preventive character. Relief of the poor and the sick was later followed by attempts at rehabilitation and cure. Now we endeavour to discover the first signs, still latent, of the troubles which may affect them.

Sociological medicine offers its assistance in the school, the workshop, the dispensary, the hospital, the social services, the family, including all children and all adults. This action should be *universal*. In order to be *integral*, it should be extended to occupational factors, housing, health, economic conditions, education and morals. Lastly, it should be *methodical* and *continuous*, so as to attain a maximum of efficiency.

Health services and centres, hospitals, child welfare bureaux, district nurses' associations, and social services ought to be correlated in a continuous network. We have organised education as far as the villages; we have extended the benefits of the postal service to the inhabitants of the most remote districts. In the same way sociological medicine and social work should cover the whole country, co-ordinating scattered administrations, combining duplicating agencies, enrolling an efficient personnel, trained for common ends as well as for individualised action. In this way rational organisation, popular education, and technical collaboration will lead to a better management of the living capital of the nation, which is the source of all wealth, material or other, and fundamentally the only true wealth. It is no doubt necessary to produce merchandise and maintain the machines, but it is, before all things, life itself which should be cultivated and enriched, extended and renewed. Reserves of men are as necessary as, and more valuable than, reserves of capital. The social inventory takes priority over the financial balance-sheet. Ill-nourished or neglected children, deserted women, men atrophied by unemployment and lives sacrificed are a more crying scandal than a deficit in the State budget. Production,

money and an economic regime are the means, not the end. The object of life is life. What heights will remain inaccessible the day when the attention we now devote to capital will serve this aim? What grandeur will impregnate the world when civilization, now the apanage of the minority, becomes the common property of men! We shall then keep precise accounts of the forces of life. We shall measure our progress by the light of human economics, no longer by the economics of money and goods.¹ The supremacy of the economic over the human interest has ended in a crisis in which poverty reigns in the midst of infinite potential riches. We can escape from this impasse only by granting priority to human factors. Sociological medicine which cultivates them, is allied to all forms of sanitary, educational and social activity. Appealing to public authorities, private initiative, the collaboration of employers and working-class solidarity, it does not aim at absolute equality or chimerical justice, but claims that no bodily or mental gifts should be allowed to run to waste. As these gifts are equally distributed at birth in all classes, the biological inequality artificially created between the groups of society by inhuman conditions of existence, can, and should be made to disappear.

On these lines we are making constant progress; the average duration of human life is increasing—the index of national progress; the death-rate of the poor begins to approach that of the rich—the index of social progress. It only needs a better organisation of our efforts to conquer the evils to which we have no right to be resigned.

By building a shelter, making clothes, kindling a fire, fashioning implements, or raising dams, primitive man claimed to be the master of his destiny. It behoves his descendants now to banish disease, poverty, ignorance and neglect. Sociological medicine is one of the instruments which will bring us nearer to this goal.

¹ The problems of human economics were discussed by Rudolf Goldscheid in 1908.

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